MAR 17 1943

Medical Library

BRITISH MEDICAL JOURNAL

SATURDAY FEBRUARY 27 1943

TABLE OF CONTENTS

Vitamins and Physical Fitness
A. A. HARPER, M.B., I. F. S. MACKAY, L.R.C.P.I., H. S. RAPER, D.SC., F.R.S., and G. L. CAMM, D.Phil. 243

Vitamins in Experimental Hyperthyroidism
V. KORENCHEVSKY, M.D., K. HALL, PH.D., and B. CLAPHAM, PH.D. 245

Endocrinology in General Medicine S. L. SIMPSON, M.D. 247

Amphetamine facilitating Electrically Induced Convulsions K. C. BAILEY, M.D. 250

Sulphanilamide for Acute Disseminated Lupus Erythematosus
J. E. G. PEARSON, D.M. 253

The Pasteurization of Milk G. S. WILSON, M.D. 261

MEDICAL MEMORANDA

An Improved Pappenheim Stain for Detection of Gonococci in Smears of Pus. MAXWELL BARRITT, M.SC., L.M.S.S.A. 254

The Vitamin C Saturation Test. W. R. G. ATKINS, SC.D., F.R.S. 254

GENERAL ARTICLES AND NEWS

Experiences in a Military Hospital in Free China. H. T. LAYCOCK, M.B., F.R.C.S. 262

Iron Lung Improvised in a Warship. A. C. K. YATES, M.B., F.R.C.S.Ed. 256

A Safe Milk Supply: Deputation to Minister of Food 265

NURSES' SALARIES 264

STERILIZATION OF SULPHANILAMIDE POWDER 263

R.C.S. SCIENTIFIC REPORT 264

THE SERVICES 272

UNIVERSITIES AND COLLEGES 272

MEDICAL NOTES IN PARLIAMENT 273

MEDICAL NEWS 275

REVIEWS

Tuberculosis Studies from U.S. 255

Surgical Treatment 255

Stoic Philosophy in Verse Form 255

Epidemiology Section 275

LEADING ARTICLES

The King's Fund 257

Unpadded Plaster Splints 257

ANNOTATIONS

Doctors Agree about Pasteurization 258

Care of the Newborn 259

Progesterone and Vitamin E 259

Incubation Period in Tuberculosis 260

Silicosis in Sweden 260

Half-yearly Indexes 260

LETTERS AND ANSWERS

Cheiropompholyx — Treatment of Parkinsonism—Treatment of Paratyphoid Carrier—Bacteriology of Diarrhoea—Income Tax—Pasteurization of Milk 276

OBITUARY

W. J. Turrell, M.D. 271

G. W. Crile, M.D. 271

M. Behr, M.R.C.S. 272

T. Lambert Drapes, M.B. 272

SUPPLEMENT

Absenteeism and Certification *30*

CORRESPONDENCE *29*

H.M. FORCES APPOINTMENTS *30*

POSTGRADUATE NEWS *30*

CORRESPONDENCE

The B.M.A. and the Beveridge Report. J. SHACKLETON BAILEY, M.R.C.S.; G. LLEWELLYN DAVIES, M.R.C.S.; J. W. E. CORY, M.D.; R. G. BLAIR, M.B. 266

A Member Resigns. J. M. HENDERSON, M.D.; C. J. STOCKER, M.D.; W. BRIAN GOUGH, M.B.; D. N. HARDCASTLE, M.R.C.S. 267

Houses to Live In. Sir WALTER LANGDON-BROWN, M.D. 268

Dietetics of Pregnancy. JOHN MARRACK, M.D. 268

Help for the Shipwrecked. Sir LEONARD HILL, M.B., F.R.S. 269

Pyogenic Skin Infections and Skin-carrier Rate. N. H. MARTIN, B.M. 269

Filaria Worm in the Eye. E. A. CHARTRES, F.R.C.S.I. 269

Aetiology of Lung Cancer. J. ARGYLL CAMPBELL, M.B. 269

Small-pox in Scotland in 1942. J. D. ROLLESTON, M.D. 270

Measure of Night Vision. B. W. RYCROFT, F.R.C.S. 270

Artificial Respiration. G. H. GIBBENS, M.D. 270

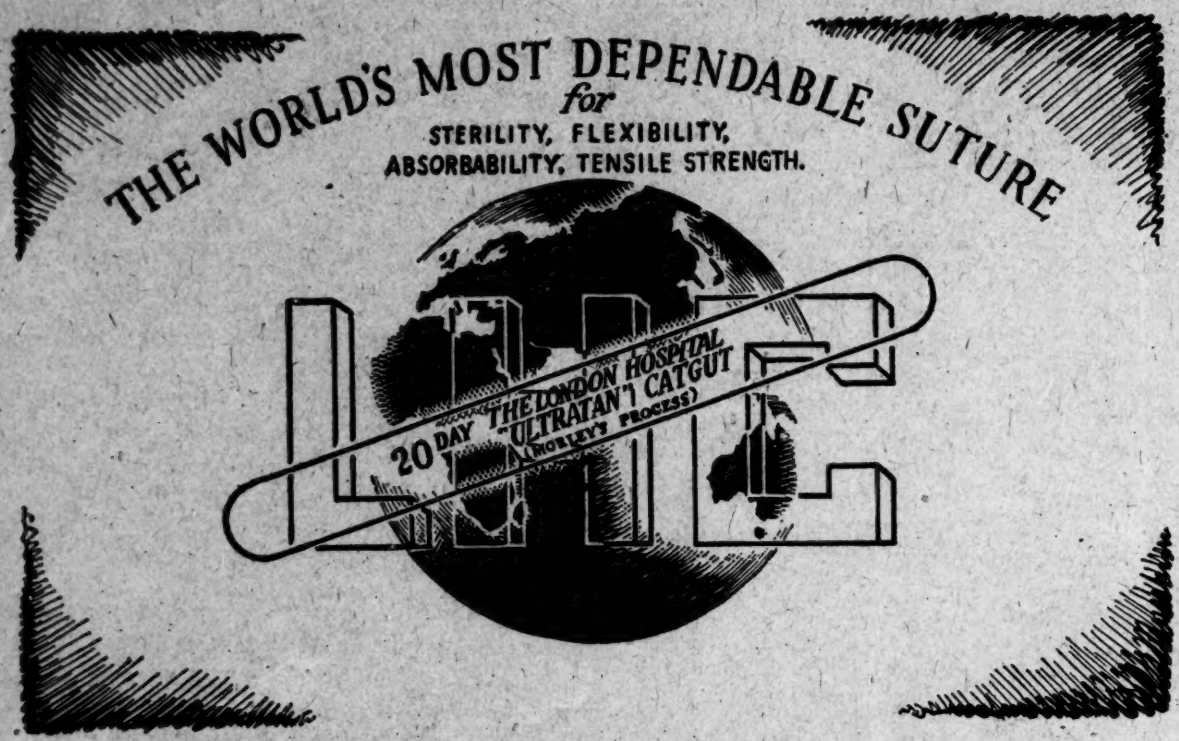
Starvation in Europe. JAMES YOUNG, M.D., F.R.C.S.Ed. 270

BRITISH MEDICAL ASSOCIATION, TAVISTOCK SQUARE, LONDON, W.C.

No. 4286, WEEKLY, PRICE 1/6

Copyright

REGISTERED AS A NEWSPAPER



Specify LONDON HOSPITAL CATGUT

OBTAINABLE FROM ALL THE LEADING SURGICAL EQUIPMENT HOUSES

THE LONDON HOSPITAL LIGATURE DEPT., LONDON, E.1, ENGLAND

Why ANDREWS *is the* Ideal Tonic Laxative

Andrews is a pleasant tasting, effervescent aperient with tonic properties, and is a valuable aid to Inner Cleanliness.

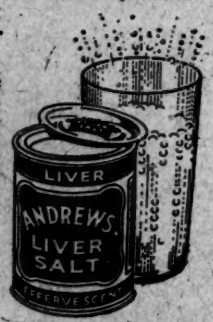
Andrews is beneficial in most digestive disorders, feverish conditions, the ailments of children, and in pregnancy and lactation. Its use may be discontinued without reaction when the need for it ceases.

Andrews justifies the description of "Ideal Tonic Laxative" because:—

FIRST.. Patients like taking Andrews, because its brisk effervescence is immediately refreshing and stimulating, it sweetens the mouth and helps to clean the tongue.

NEXT.. Andrews allays gastric discomfort, heartburn and nausea by diminishing the stomach's acidity and relieving flatulence.

THEN.. Andrews increases bile flow, relieves hepatic congestion, and improves digestion. It is partly absorbed from the intestine as alkali, and therefore helps to correct acidity in the blood and to stimulate kidney function.



FINALLY.. Acting by osmosis, Andrews clears the bowels gently and entirely without irritation.

ANDREWS LIVER SALT

SCOTT & TURNER LTD · ANDREWS HOUSE · NEWCASTLE-UPON-TYNE 2

M18

MERSONS EDINBURGH, 8

HAVE DEVISED A SUTURE SILK WHICH IS

NON-CAPILLARY

SERUM-PROOF

NON-IRRITANT

MERSILK is superior to ordinary waxed silk . . . is safe . . . may be steam-sterilised or boiled.

G. F. MERSON LTD. **MERSILK**

BRITISH MEDICAL JOURNAL

LONDON SATURDAY FEBRUARY 27 1943

VITAMINS AND PHYSICAL FITNESS

BY

A. A. HARPER, M.A., M.B., Ch.B.

I. F. S. MACKAY, Ph.D., L.R.C.P.I. H. S. RAPER, C.B.E., D.Sc., F.R.S.

Department of Physiology

AND

G. L. CAMM, M.A., D.Phil.

Department of Mathematics
Manchester University

The purpose of the present experiment was to test whether, as the result of a deficiency in the average student's diet, the fitness of University students has diminished since the beginning of the war.

Procedure of Experiment

In two groups of students the effects of adding vitamin supplements to the diet of one group were studied. Certain anthropometric data, "physical efficiency tests," and the incidence of minor ailments were used as a basis of comparison of the two groups. The experiment was performed on 69 subjects over a period of 21 weeks (April 18 to Sept. 11, 1942). The subjects were 40 R.A.F. and 29 R.E. cadets attending a special short course at Manchester University. The cadets had only recently joined the Forces, were all about the same age (18–19), and had roughly the same social background; they lived in two of the University halls of residence, and had the ordinary undergraduate diet: breakfast and supper in hall and a midday meal in the refectory at the University.

Examination.—The subjects were first examined by A. A. H. and I. F. S. M. The examination consisted of the usual anthropometric data: height (standing and sitting), weight, chest girths ("normal," expiration, and inspiration), the distance between the iliac crests, and the bi-trochanteric diameter. In addition the following measurements were made:

(*a*) The resting heart rate (4 successive half-minute periods after the subject had rested in the recumbent position for 15 minutes), the standing heart rate (4 successive half-minute periods immediately after standing up); and the effect of exercise on the heart rate (measured 0–15 and 60–90 seconds after stepping on and off a 40-cm. box 15 times in 30 seconds).

(*b*) The resting vital capacity (the maximum expiration following a full inspiration, the expired air being collected in a Hutchinson bell spirometer: four attempts were allowed, and the maximum recorded); and the post-exercise vital capacity (measured 30 seconds and 90 seconds after 40 knee-bends in 1 minute).

(*c*) The R.A.F. breath-holding and endurance tests. The breath-holding test is the time in seconds during which the subject can hold his breath after a deep expiration followed by a full inspiration. In the endurance test the subject, with his nose clipped, expires deeply, and then, after a full inspiration, blows the column of mercury in a manometer steadily to a height of 40 mm. and maintains it at that level for as long as possible without breathing. The time during which the mercury column is sustained is measured in seconds, and the pulse rate for successive 5-second periods is noted during that time.

Vitamin Supplements.—The cadets were then divided into two groups. Group 1 (35 students) were given a daily vitamin supplement consisting of 6,000 units of vitamin A, 1,000 units of vitamin D, and 50 mg. of vitamin C, in the form of one "adexolin" capsule and one "celin" tablet daily. Group 2 (34 students), who acted as controls, received capsules of arachis oil and tablets containing citric acid, identical in appearance with those given to group 1 but devoid of any vitamin content. Each group contained half the R.A.F. and half the R.E. cadets; care was also taken to see that the men examined by A. A. H. and I. F. S. M. were equally divided between the two groups.

History of Minor Ailments.—A fortnight's supply of capsules and tablets was issued to the cadets at a time. Each cadet was interviewed by one of us every fortnight, when he collected a fresh supply of vitamins, and a history was taken of any minor complaints during the previous two weeks, particular attention being paid to respiratory and gastro-intestinal upsets and to bleeding from the gums.

Re-examination and Change-over of Groups.—At the end of 10 weeks (June 25) the cadets were all re-examined, the same routine being used as in the first examination. At the same time the two groups were changed over: group 1 were now given control tablets and capsules, and group 2 vitamin tablets and capsules.

Final Examination.—The experiment was continued for a further 11 weeks (until Sept. 11), and the examination of the cadets was again repeated. Each cadet was examined on all three occasions by the same examiner. The cadets were not told whether they were on vitamin or control tablets, and did not know of the change-over of the two groups half-way through the experimental period. The examiners did not know which of the cadets were on vitamin supplements and which were on control.

Results

The detailed analysis of the various sets of measurements was made by Dr. G. L. Camm. In addition to considering the vitamin and control groups during each half of the experiment and over the whole experimental period, a separate sub-analysis was made of the behaviour of the R.A.F. and of the R.E. cadets. In brief the main observations are as follows:

1. Minor Complaints

The average number of days of minor respiratory and gastro-intestinal complaints per man was estimated. These included acute and chronic colds, loss of appetite, "indigestion," and, occasionally, nausea and vomiting. The minor nature of most of the complaints must be emphasized; they were "subclinical" in the sense that only in a small minority were the subjects ill enough to stop work. We would emphasize also that these figures are compiled from the histories given by the subjects. Only in a few instances did we verify their statements by examination. Very few cases of bleeding gums were reported, and these have been omitted from the calculations. Complaints during the first fortnight of the experiment, and during the first three weeks after changing over the groups, were also omitted, as it was considered that during these periods there was not enough time for any possible protective action of the vitamins to become apparent. It was found that over the other 16 weeks of the experiment the control group showed an

incidence of complaints 50% greater than the vitamin group. The total figures were: vitamin group, 671 days; control group, 1,015 days. The mean figures were: vitamin group, 9.7 days per man; control group, 14.9 days. Mean difference (vitamin−control): -5.2 ± 1.7. The difference between the two groups is statistically significant.

2. Physical Examinations

The means of the various measurements made during the three examinations were calculated, and examined to see whether there were any significant differences between the vitamin and control groups. There was no significant difference in respect of the anthropometric measurements (heights, weight, chest girths, and pelvic measurements). Nor were any significant differences found on comparing the standing pulse rate, the pulse rate during the R.A.F. endurance test, the post-exercise pulse rate, or the post-exercise vital capacity in the two groups. On the other hand, in four of the measurements made, interesting differences were found between the vitamin and control groups. These measurements were (i) the resting vital capacity, (ii) the breath-holding time, (iii) the R.A.F. endurance test time, and (iv) the resting pulse rate.

Resting Vital Capacity.—At the beginning of the experiment the mean resting vital capacity was the same for the two groups. At the end of the first half of the experiment the vital capacity of both groups had increased, but much more so in group 1 (vitamin) than in group 2 (control). At the third examination the vital capacity of group 1 (now control) had diminished, and that of group 2 (now vitamin) had increased. At both examinations, therefore, the balance of improvement was in favour of the cadets who had been receiving vitamins for the previous 10 or 11 weeks. The differences between the vitamin and control groups are statistically significant. A separate sub-analysis of the R.A.F. and of the R.E. cadets also reveals a significant difference between the vitamin and control groups in both cases. The results are shown in Table I and Fig. 1.

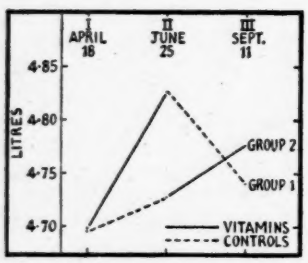


FIG. 1.—Resting vital capacity.

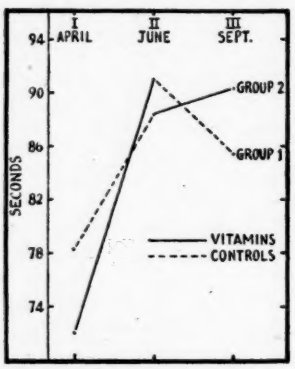


FIG. 2.—Breath-holding time.

TABLE I.—*Resting Vital Capacity in Litres*

	1st Exam.		2nd Exam.		3rd Exam.
Group 1	4·698	(vitamin)	4·826	(control)	4·740
Group 2	4·694	(control)	4·727	(vitamin)	4·776

Whole period: Mean difference (vitamin−control) = $+0.119 \pm 0.022$

Breath-holding Time.—The results resemble those of the vital-capacity measurements. At the end of the first half of the experiment the increase in breath-holding time in group 1 (vitamins) was much greater than in group 2 (control). At the end of the experiment, following the change-over of the two groups, the average time for group 1 had decreased, while that for group 2 had increased. At each examination, therefore, the cadets on vitamins showed a greater improvement than those on control tablets. Statistical analysis revealed a definitely significant difference between the vitamin and control groups of the R.A.F. cadets and a just-significant difference betwen the combined groups.

The results are shown in Table II and Fig. 2.

TABLE II.—*Breath-holding Time in Seconds*

	1st Exam.		2nd Exam.		3rd Exam.
Group 1	72·1	(vitamin)	91·0	(control)	85·4
Group 2	78·2	(control)	88·4	(vitamin)	90·3
Difference (vitamin−control):			$+8.6 \pm 3.7$		$+7.4 \pm 3.9$

Mean difference over whole experimental period (vitamin−control) = $+8.0 \pm 2.7$

Endurance Test.—An examination of the times during which the cadets could maintain a column of mercury at a height of 40 mm. by a steadily exerted expiration shows changes similar to those in the breath-holding times, but less marked in degree. In each half of the experiment the group then on vitamins increased its time more than the control group. The differences are statistically significant only for the R.E. cadets.

The results are shown in Table III and Fig. 3.

TABLE III.—*Endurance Test Times in Seconds*

	1st Exam.		2nd Exam.		3rd Exam.
Group 1	55·3	(vitamin)	64·3	(control)	68·7
Group 2	63·4	(control)	64·7	(vitamin)	71·3

Whole period: Mean difference (vitamin−control) = $+5.1 \pm 2.3$
Mean difference for R.E. cadets = $+6.7 \pm 1.8$

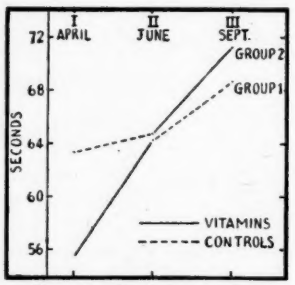


FIG. 3.—Endurance test.

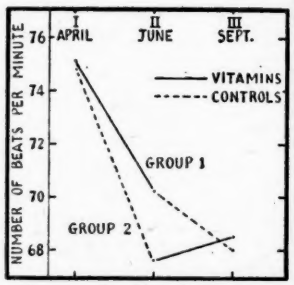


FIG. 4.—Resting heart rate.

Resting Heart Rate.—The changes in resting vital capacity and in the breath-holding and endurance test times—showing in each a greater improvement in the vitamin than in the control groups—were such as might have been expected, assuming that the extra vitamins had increased the "physical fitness" either by diminishing the incidence of minor illnesses or by some other mechanism. The changes in the resting heart rate, however, were unexpected, if one accepts the popular view that a slow heart rate is a sign of "physical fitness." At the first examination the heart rates of both groups were practically the same. At the second examination the heart rates of both groups had diminished, but the slowing was more pronounced in the control than in the vitamin group. At the third examination it was found that the new control group showed a further diminution in heart rate, but the new vitamin group had increased in heart rate. The differences are statistically significant only in the R.E. cadets.

The results are shown in Table IV and Fig. 4.

TABLE IV.—*Heart Rate at Rest, per Minute*

	1st Exam.		2nd Exam.		3rd Exam.
Group 1	75·1	(vitamin)	70·2	(control)	68·0
Group 2	74·8	(control)	67·6	(vitamin)	68·5

Whole period: Mean difference (vitamin−control) = $+2.7 \pm 1.0$
Mean difference for R.E. cadets = $+4.5 \pm 1.4$

Discussion

The results of the experiment suggest that even during the summer months the diet of the students examined was sufficiently below the optimum level in respect of one or all of vitamins A, C, and D to produce a significantly greater amount of minor respiratory and gastro-intestinal upset than a similar diet supplemented with these vitamins. The greater improvement in resting vital capacity and in breath-holding and endurance times in cadets receiving vitamin supplements may be a reflection of this lessened susceptibility to minor infections, or may be due to some other action of the vitamins. The faster resting pulse rate in the cadets receiving vitamin supplements is difficult to explain.

The validity of these conclusions may be attacked on two grounds: first, that the number of subjects (69) was too small for an experiment upon nutrition and physical fitness; and, secondly, that the differences between the vitamin and control groups in vital capacity, etc., are not striking enough to warrant the drawing of any conclusions.

With regard to the second objection, Jokl, Cluver, Goedvolk, and de Jongh (1941), using a smaller group (32), found that repeated examinations of vital capacity and resting pulse rate showed mean figures varying only a matter of 20 to 30 c.cm. in the case of the vital capacity and fractions of one beat in the case of the pulse rate. All our variations are much greater than these.

The first objection (the paucity of numbers in the experimental group) is more valid. It is to some extent offset by the homogeneity of the group. All the cadets were of the same age, of the same social class, and during the experimental period were living under identical dietetic conditions. Another factor which increases the value of the observations is the striking manner in which the change over of vitamin and control groups half-way through the experiment in each case resulted in a reversal of the behaviour of the groups. This obviously increases the significance of the separate sets of observations, but no allowance for this was made in the computation of the results. The two halves of the experiment were treated separately, as if a second group of 69 students had been used for the second half. Had this actually been the case the differences obtained might well have been due to selection; but this can hardly be the true cause, since the same students were merely interchanged.

Despite these objections we feel that this report may be of value in drawing attention to a possible method of assessing the optimal rather than the minimal requirements of vitamins in the diet. A diet containing less than the optimum amount of a particular vitamin, while not producing a deficiency disease, may nevertheless give rise to a suboptimal physiological state which will only be revealed by the application of physiological tests such as we describe.

Summary

The effects of adding supplements of vitamins A, C, and D to the diet have been studied over a period of five months in 69 cadets living in university halls of residence at Manchester.

The cadets receiving vitamin supplements were less susceptible to minor respiratory and gastro-intestinal complaints than those receiving control tablets which contained no vitamins.

The group receiving vitamins showed a greater increase in resting vital capacity and in breath-holding and endurance times, and had a faster resting pulse rate than the control group.

We wish to express our thanks to Glaxo Laboratories Ltd. for facilitating the supply of vitamin and control tablets and capsules.

REFERENCE

Jokl, E., Cluver, E. H., Goedvolk, C., and de Jongh, T. W. (1941). *Training and Efficiency*, South African Institute for Medical Research, Johannesburg.

EFFECTS OF VITAMINS ON EXPERIMENTAL HYPERTHYROIDISM

BY

V. KORENCHEVSKY, M.D.

K. HALL, Ph.D.

AND

B. CLAPHAM, Ph.D.

(From the Lister Institute, London)*

The problem of the relationship between thyroid hormone and vitamins is of great importance for the proper therapeutical application of these substances in several diseases and also for the treatment of hyperthyroidisms—in particular, Graves's disease. The existing literature on the subject is so large that economy of space unfortunately makes it impossible to review it here, but it will be reviewed elsewhere. At the same time it is most contradictory, apparently because the following facts have not been taken into consideration by some of the workers:

1. Vitamins are food factors; therefore thyroid hormone, the chief function of which is to increase the oxidation processes in the organism, increases the metabolism of the vitamins in a similar way to that, for example, of proteins, fats, and carbohydrates. Thus depletion of *vitamin A* in the organism of animals by thyroid hormone administration has been found by Abelin (1933), Parhon and Werner (1935), Sure and Buchanan (1937), and Mlinko (1938); a similar condition in hyperthyroid patients was indicated by Wohl and Feldman (1938). With regard to *vitamin B*, of especial importance are experiments by Himwich, Goldfarb, and Cowgill (1932), Hendricks (1933), Cowgill and Palmieri (1933), Cowgill (1934), and Drill (1938), who showed that the requirement of vitamin B of an organism per unit of mass is proportional to the metabolism of that mass, and that thyroid hormone therefore greatly increases this requirement. The depletion of *vitamin C* from the animal organism by thyroxine has been recorded by Demole and Ippen (1935), Plaut and Bülow (1935), Mosonyi (1935), Nespor (1936), Sure and Theis (1938), and Thaddea (1938). Increase of metabolism due to any cause accordingly requires increased administration of vitamins: e.g., in the case of muscular work, Cowgill (1934) found this for vitamin B and Hamel (1937) for vitamin C.

2. Therefore when even non-toxic doses of thyroid hormone are given or mild hyperthyroidism is present without a corresponding increase in vitamin administration, a relative vitamin deficiency might develop with more or less pronounced symptoms of anorexia, partial starvation, and loss of body weight.

3. For these reasons it is difficult to draw definite conclusions as to the antagonistic effects of thyroid hormone and vitamins from the experiments of several previous workers who used, often deliberately, a diet deficient in, or containing only a minimal normal amount of, the vitamin investigated, or used toxic doses of thyroid hormone.

The effects produced by any substance differ greatly according to whether toxic or non-toxic doses are used. In toxicosis, non-specific, mostly destructive, changes occur which obscure the specific changes. This is true both for thyroxine and for vitamins.

Technique

Non-toxic Experiments.—All these facts were taken into consideration when planning our experiments (see Tables I and II), performed on rats kept on our usual diet. This diet is rich enough in all vitamins to ensure (this appears to be the best test) excellent breeding results. We have chosen as criteria for judgment of antagonism or co-operative activity the changes in body weight and weights of most of the organs, fat deposition, and histological structure of thyroid gland. We have used non-toxic doses both of thyroid hormone and of vitamins, but in the case of vitamins, except with vitamin D, they were much above the normal requirement, while with thyroid hormone they were large enough to produce specific and typical changes (Korenchevsky and Hall, 1941).

Experiments were performed on 121 male rats for investigation of the effects of vitamins B and C, and on 66 female rats for investigation of vitamins A and D. The final age of the rats averaged 150 days. Each experiment was repeated twice. Although the doses and, in the case of vitamin B complex, the numbers of vitamins B used were somewhat different in the first and second experiments, the results were similar. The data from both experiments were therefore pooled, and average figures only are given in Tables I and II.

TABLE I.—*Effects of Non-toxic Hypervitaminosis A and D on the Means of Body Weight, Fat Deposition, and Actual Weights of Organs in Normal Female Rats and in Rats treated with Non-toxic Doses of Thyroid Hormones**

Organs	Co−V	Co+V	Thy−V	Thy+V
	Group 1	Group 2	Group 3	Group 4
Ovaries, mg.	68	68	87	84
Preputial glands, mg.	94	85	139	132
Adrenals, mg.	50	52	75	77
Thymus, mg.	288	332	289	273
Liver, g.	7·05	7·03	9·57	9·64
Kidneys, g.	1·29	1·32	2·12	2·11
Spleen, mg.	729	674	1,002	1,226
Heart, mg.	714	712	1,028	1,036
Abdominal fat, g.	7·4	7·6	1·6	1·7
Final body weight, g.	196	195	188	186
Gain in body weight, g.	52	51	43	38
No. of rats in group	16	16	16	18

* In this and the following table "Co−V" denotes the group of control rats receiving no additional substances; "Co+V" the group of rats receiving an extra amount of vitamins; "Thy−V" the group of rats receiving thyroid hormone alone; "Thy+V" the group of rats receiving simultaneously thyroid hormone and an extra amount of vitamins.

No changes in weight of uterus, vagina, thyroid, hypophysis, and brain were obtained in this experiment.

The doses used were as follows: In the first experiment 85 mg. of desiccated thyroid in the form of a sweetened emulsion was given orally by pipette 3 times a week; and 0.6 mg. of thyroxine

* Dr. Korenchevsky desires to express to the University of Oxford and to Prof. E. S. Goodrich his own and the Lister Institute's gratitude for the kind hospitality extended to him and his co-workers in the Department of Zoology and Comparative Anatomy.

was injected subcutaneously twice a week. In the second experiment desiccated thyroid only was given, but in a larger dose—180 mg. for the first month of the experiment and 280 mg. for the rest of the experiment—6 times a week. Vitamins A and D were given orally in the form of halibut-liver oil diluted with cod-liver oil, the daily dose (4 drops by pipette) containing aneurin, pyridoxine, and calcium pantothenate. The doses were also the same, except the dose of aneurin injected, which was raised to 1 mg. The rats of group 4 received in addition yeast and wheat germ (incorporated in the diet in the same proportions as in our original diet) either alone or plus the same amount of crystalline vitamins B as in group 3.

TABLE II.—*Effects of Hypervitaminosis B (Groups 1–4) and C (Groups 5–8) on the Means of Body Weight, Fat Deposition, and Actual Weights of Organs in Normal Male Rats and in Rats treated with Non-toxic Doses of Thyroid Hormone* *

Organs	Effect of Vitamins B				Effect of Vitamin C			
	Co−V	Co+V	Thy−V	Thy+V	Co−V	Co+V	Thy−V	Thy+V
	Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8
Seminal vesicles, mg.	727	822	620	558	646	711	481	459
Prostate, mg.	935	1,010	803	815	911	939	731	702
Preputial glands, mg.	128	110	138	146	116	105	147	144
Adrenals, mg.	23	24	45	45	35	34	47	47
Thymus, mg.	290	273	243	199	298	268	233	255
Liver, g.	9·68	10·79	10·66	9·99	9·80	10·29	11·31	10·43
Kidneys, g.	1·88	2·02	2·71	2·47	1·93	1·91	2·75	2·48
Spleen, mg.	991	1,109	1,611	1,439	982	1,137	1,591	1,434
Heart, mg.	928	976	1,289	1,235	949	939	1,290	1,234
Abdominal fat, g.	8·1	10·2	4·3	3·4	9·0	9·7	3·4	3·5
Final body weight, g.	268	285	242	230	272	270	239	237
Gain in body weight, g.	77	93	48	48	93	93	59	55
No. of rats in group	15	16	17	16	13	14	15	15

* No changes in weight of testes, penis, thyroid, hypophysis, and brain were obtained.

1,300 I.U. of vitamin A and 70 I.U. of vitamin D, 6 times a week in both experiments.

In the first experiment vitamins B were given orally in the form of a sweetened emulsion 6 times a week, the daily dose being: aneurin 0.22 to 0.5 mg., riboflavin 0.22 to 0.5 mg., nicotinic acid 2.2 to 5 mg. In the second experiment the same vitamins B and doses were given by mouth, with in addition subcutaneous injections 6 times a week, each dose containing 0.4 to 0.5 mg. aneurin, 0.5 mg. pyridoxine, and 1.5 to 2 mg. calcium pantothenate. In both experiments 20 mg. of vitamin C was given orally by pipette 3 to 6 times a week, and in addition 25 to 40 mg. was injected subcutaneously 6 times a week. The duration of the first series of experiments was 53 days and of the second 47 days.

Toxic Experiment.—An additional experiment was performed on 18 male rats (Table III) in order to discover in particular whether different effects are produced by thyroid hormone and vitamins B when (as in most experiments of previous workers) toxic doses of thyroid hormone are given to animals fed on a diet deficient in or containing a minimal normal amount of vitamins.

TABLE III.—*Effects of Hypervitaminosis B on the Means of Body Weight, Fat Deposition, and Actual Weight of Organs in Male Rats treated with Toxic Doses of Thyroxine*

Organs	Controls	Thyroxine 1 mg. Daily		
		Alone	+Crystalline Vits. B	+Cryst. Vits. B +Yeast +Wheat Germ
	Group 1	Group 2	Group 3	Group 4
Testes, g.	2·81	2·58	2·24	2·61
Seminal vesicles, mg.	934	361	487	408
Prostate, mg.	712	397	452	486
Penis, mg.	294	241	234	271
Adrenals, mg.	24	36	33	36
Thyroids, mg.	20	20	18	16
Thymus, mg.	250	130	156	120
Liver, g.	9·36	6·78	7·84	8·19
Kidneys, g.	1·65	1·91	1·99	2·33
Spleen, mg.	834	757	1,454	1,106
Heart, mg.	818	1,058	1,019	1,073
Abdominal fat, g.	4·2	1·4	1·4	1·3
Final body weight, g.	215	152	174	176
Gain (+) or loss (−) in body weight, g.	+63	−4	+17	+14
No. of rats in group	5	4	4	5

The diet was the same as that used in the non-toxic experiments but made considerably poorer in vitamin B complex by the exclusion of yeast and wheat germ, which were replaced by bread, and the substitution of rolled oats only for the grain mixture. One mg. of thyroxine was injected daily for 13 days, the rats being killed on the fourteenth day. To the rats of group 3 (Table III) the same vitamins B were given as in our second experiment: aneurin, riboflavin, and nicotinic acid by mouth, supplemented by subcutaneous injections of

All changes obtained were statistically analysed by one of us (B. Clapham) by means of Fisher's t-test. Unless they are mentioned as being "statistically not significant," all the results obtained were found to be statistically significant.

Experimental Hyperthyroidism

Non-toxic Hyperthyroidism.—The following changes, all statistically significant, were observed after administration of non-toxic doses of thyroid hormone (compare, in Table I, group 3 with group 1, and in Table II, groups 3 and 7 with groups 1 and 5): decreased gain in body weight and fat deposition, hypertrophy of adrenals, liver, kidneys, spleen, heart, and preputial glands in both sexes; hypertrophy of ovaries in females; and small decrease of seminal vesicles and prostate in males. Histological changes in the thyroids demonstrated a strong depressing effect on their function (flattened epithelium, accumulation of solid colloid in enlarged follicles). A preliminary histological examination of ovaries, adrenals, liver, kidneys, spleen, and heart confirmed our conclusion suggested by the increase in weight of these organs—namely, that thyroid hormone has a stimulating hypertrophying effect on them. A detailed microscopical investigation, however, might show new facts; it will be described elsewhere. Thus non-toxic doses of thyroid hormone simultaneously increased both anabolism (shown by hypertrophy of several of the organs) and katabolism (decreased gain in body weight and fat deposition), the anabolic processes prevailing over the katabolic. Although the treated animals were thinner than the controls they had the appearance of perfectly healthy animals.

Thyroid hormone therefore has hepatotrophic, nephrotrophic, and cardiotrophic properties similar to those of androgenic hormones (Korenchevsky and Ross, 1940; Korenchevsky, Hall, Burbank, and Cohen, 1941), but its effect on adrenals appears to be different from that of androgens (Hall and Korenchevsky, 1938). The effect of simultaneous administration of thyroid and androgenic hormones should be investigated with the object of determining whether they might be used for therapeutical purposes in suitable diseases of liver, kidneys, and heart. Epstein (1922, p. 186), for example, obtained "striking" favourable results after the treatment of chronic parenchymatous nephrosis with thyroid hormone.

Toxic Hyperthyroidism.—The administration of toxic doses of thyroid hormone was followed by an atypical reaction (compare group 2 with group 1, Table III): loss of body weight, much greater atrophy of seminal vesicles and prostate and considerably less hypertrophy of kidneys, atrophy instead of hypertrophy of liver and spleen, decrease of testes, and pronounced involution of thymus. At the same time all the animals became weak and emaciated; their fur became dull, rough, and dirty; most rats suffered from diarrhoea and began to lose weight; and some died from thyrotoxicosis before the end of the experiment. Histologically the same depression of thyroid function was observed as with non-toxic doses. Thus

in general, instead of the predominant typical anabolic and hypertrophic reaction (still preserved only in adrenals and heart), with toxic doses katabolic and atrophic changes prevailed, resulting in some cases in the death of the animals.

Effect of Hypervitaminosis

The administration of the extra amounts of vitamins produced no considerable effects, if any (compare group 2 with group 1, Table I; and groups 2 and 6 with groups 1 and 5, Table II). Hypervitaminosis B and C (Table II) produced in male rats a small, consistent, but statistically not significant increase of seminal vesicles, liver, and fat deposition. Vitamin B also produced greater gain in body weight and improvement in external appearance and behaviour (the rats appeared to be more lively and, when handled, felt firmer and stronger, and had thicker and more glossy fur than the control groups "Co−V"). Histologically no definite effect of these doses of vitamins could be found on the structure of the thyroid gland, except perhaps a slightly depressing effect of halibut and cod-liver oils. This could easily be explained by the extra amount of iodine given in these oils (Mellanby, 1934; Sampson and Korenchevsky, 1932).

Effect of Hypervitaminosis on Hyperthyroidism

The effect of hypervitaminosis on non-toxic hyperthyroidism (group 4 in Table I, and groups 4 and 8 in Table II) was different from that on toxic hyperthyroidism (groups 3 and 4, Table III). In rats kept on our *normal diet and receiving non-toxic* doses of thyroid hormone, vitamins A and D (in the doses given) did not at all affect the specific reaction of organs and tissues to this hormone, while vitamins B and C produced a slight decrease in the hypertrophy of liver and kidneys. In rats kept on a *minimal normal* amount of vitamins B (Table III) and injected with *toxic* doses of thyroxine, the simultaneous administration of extra amounts of vitamins B was followed by a gain instead of a loss in body weight and the partial restoration of specific anabolic changes instead of a pathological (atrophic and almost exclusively katabolic) reaction of the organs to thyroid hormone. In such animals the atrophic changes were decreased in seminal vesicles, prostate, and liver and replaced by hypertrophy in spleen, while in kidneys hypertrophy became more pronounced. The fact that some typical reactions to thyroxine were not prevented in such animals indicates that in vitamin-treated rats suffering from thyrotoxicosis all the improvements described both by previous workers and by ourselves (including gain instead of loss in body weight) could be explained by the making good of the relative vitamin deficiency produced by, and complicating, the thyrotoxic effects. Histologically the thyroid glands were in the same resting condition as in the rats treated with thyroid hormone alone.

The results of our experiments therefore indicate that for the investigation of antagonistic effects neither toxic doses of thyroxine, which greatly raise the vitamin requirements and produce non-specific changes, nor diets with inadequate levels of vitamin content appear to be suitable.

Conclusions

In the therapeutical application of thyroid hormone its katabolic properties in raising metabolism and especially in reducing body fat are often taken most into consideration.

The results of our experiments (as judged by changes in weights and histological structure of organs) and those of some previous workers emphasize that thyroid hormone also possesses anabolic properties, which can lead to better development of such vital organs as liver, kidneys, spleen, heart, and adrenals in both sexes, and ovaries in females.

As shown especially in our experiments on females, it is possible, using moderate doses of thyroid hormone, to reduce the body fat to about one-fifth without affecting appreciably the gain in body weight, and at the same time preserving the stimulating anabolic effects of this hormone on the development of the vital organs mentioned above.

Thus from small or moderate doses of thyroid hormone favourable therapeutical results can be expected, but when large doses are given the useful effects disappear and the hormone becomes atypically toxic and dangerous.

The useful effects of thyroid hormone cannot be normally and fully operative, unless liberal amounts of vitamins are given simultaneously, because of the increased requirements in vitamins which arise during conditions accompanied by increased metabolism (such as those produced by thyroid hormone).

Therefore the best possible therapeutical results can be expected from simultaneous administration of thyroid hormone with extra amounts of vitamins.

Since both thyroid hormone and male sex hormones possess hepato-, nephro-, and cardiotrophic properties, and thyroid hormone also produces ovario-, spleno-, and adrenotrophic effects, the possibility of therapeutical application of thyroid hormone in cautious doses with vitamins, or together with sex hormones, should be investigated in some suitable diseases of liver, kidneys, and heart, or when an increased activity of ovaries, adrenals, or spleen is desirable.

The results of our experiments and those of some previous workers do not suggest, as has been stated by certain authors, any direct antagonistic effects of vitamins on thyroid hormone; but the data indicate that some beneficial results of the administration of vitamins in some cases of experimental and clinical hyperthyroidism were probably due chiefly to removal of the relative vitamin deficiency present in these cases.

Grants from the Medical Research Council and the Lister Institute have enabled us to carry out this work, and to them we offer our thanks. We are also grateful to the Ella Sachs Plotz Foundation for a grant from which some of the technical expenses were met. We are indebted to Messrs. Roche Products Ltd. for the generous supply of vitamins, and to Messrs. Parke, Davis and Co. for the liberal supply of desiccated thyroid powder.

References

Abelin, I. (1933). *Hoppe-Seyl. Z.*, **217**, 109.
Cowgill, G. R. (1934). *The Vitamin B Requirement of Man*, p. 65, New Haven.
—— and Palmieri, M. L. (1933). *Amer. J. Physiol.*, **105**, 146.
Demole, V., and Ippen, F. (1935). *Hoppe-Seyl. Z.*, **235**, 226.
Drill, V. A. (1938). *Amer. J. Physiol.*, **122**, 486.
Epstein, A. A. (1922). *Amer. J. med. Sci.*, **163**, 167.
Hall, K., and Korenchevsky, V. (1938). *J. Physiol.*, **91**, 365.
Hamel, P. (1937). *Klin. Wschr.*, **16**, 1105.
Hendricks, W. A. (1933). *Amer. J. Physiol.*, **105**, 678.
Himwich, H. E., Goldfarb, W., and Cowgill, G. R. (1932). Ibid., **99**, 689.
Korenchevsky, V., and Ross, M. A. (1940). *British Medical Journal*, **1**, 645.
—— and Hall, K. (1941). *Biochem. J.*, **35**, 726.
—— —— Burbank, R. C., and Cohen, J. (1941). *British Medical Journal*, **1**, 396.
Mellanby, E. (1934). *Nutrition and Disease*, London.
Mlinko, Z. (1938). *Hoppe-Seyl. Z.*, **256**, 42.
Mosonyi, J. (1935). Ibid., **237**, 173.
Nespor, E. (1936). *C. r. Soc. Biol.*, Paris, **122**, 427.
Parhon, C. I., and Werner, G. (1935). Ibid., **118**, 1659.
Plaut, F., and Bülow, M. (1935). *Klin. Wschr.*, **14**, 1318.
Sampson, M. M., and Korenchevsky, V. (1932). *Biochem. J.*, **26**, 1322.
Sure, B., and Buchanan, K. S. (1937). *J. Nutrit.*, **13**, 521.
—— and Theis R. M. (1938). *Proc. Soc. exp. Biol.*, N.Y., **37**, 646.
Thaddea, S. (1938). *Arch. exp. Path. Pharmak.*, **190**, 227.
Wohl, M. G., and Feldman, J. B. (1938). *Trans. 3rd International Goiter Conference*, p. 460, Portland, Oregon.

THE INCREASING IMPORTANCE OF ENDOCRINOLOGY IN GENERAL MEDICINE*

BY

S. L. SIMPSON, M.D., F.R.C.P.

Physician, Willesden General Hospital, with charge of Diabetic Clinic; Physician, Princess Louise Kensington Hospital for Children; Consulting Physician, Soho Hospital for Women

In this address I hope to be able to indicate clearly that the "increasing importance of endocrinology in general medicine" is a reality and is of interest to the physician, surgeon, and gynaecologist, and therefore to the general practitioner.

Adrenal–Pituitary Disorders

Cushing's Syndrome.—I shall first consider a syndrome which has been brought into prominence in the last decade by the observation of Harvey Cushing (1932), but which had already been recognized and described as the "fat bearded diabetic woman" by Achard and Thiers. The eponymous title was suggested by Parkes Weber, who had himself previously given a magnificent clinical description of the disorder. Cushing's invaluable contribution was to draw attention to the possibility of a basophil adenoma of the anterior pituitary being a primary cause, comparable to the eosinophil adenoma of acromegaly. It is now recognized that other primary causes exist—namely, tumours of the adrenal cortex, of the ovary, and of the thymus

* Delivered as the Annual Oration to the Leeds Jewish Hospital Medical Society, Nov. 29, 1942.

—but Crooke (1935) has shown that a constant change in all these pathological entities is hyalinization of the basophil cells of the anterior pituitary. Cushing described his syndrome as follows:

> "(1) A rapidly acquired, peculiarly disposed, and usually painful adiposity (in one instance representing a 40% gain in weight), confined to the face, neck, and trunk, the extremities being spared; (2) a tendency to become round-shouldered (kyphotic), even to the point of measurable loss of height associated with lumbo-spinal pains; (3) a sexual dystrophy shown by early amenorrhoea in the females and ultimate impotence in the males; (4) an alteration in normal hirsuties shown by a tendency to hypertrichosis of face and trunk in all the females as well as the pre-adolescent males and possibly the reverse in adult males; (5) a dusky or plethoric appearance of the skin with purplish lineae atrophicae; (6) vascular hypertension; (7) a tendency to erythraemia; (8) variable backaches, abdominal pains, fatigability, and ultimate extreme weakness."

This description gives an indication of the protean manifestations of an endocrinopathy, but it is more important to realize that a presenting symptom may overshadow the rest of the picture. Thus the disorder may be diagnosed as essential hypertension, nephritis, malignant nephrosclerosis, cerebral tumour, diabetes mellitus, polycythaemia, idiopathic adiposity, or sterility in the female or impotence in the male. It is also important to remember that an idiopathic adiposity may be the precursor of the complete syndrome, which may manifest itself only at the climacteric or in the course of a pregnancy. Not all patients developing Cushing's syndrome are sterile or without menstrual bleeding, although the latter tends to be scanty (Simpson, 1936).

The differentiation of the pathological varieties of Cushing's syndrome is helped by biological assay, and in 1934 and 1936 my colleagues and I recorded a high androgen excretion in virilism. I suggested the origin of androgens from the adrenal cortex and the significance of urinary 24-hourly values above 300 international units as indicating an adrenal cortical tumour. Work in this field was fruitfully developed by R. K. Callow (1938a, 1938b), with whom I collaborated on the clinical side over a number of years, especially in the demonstration of urinary androgens after bilateral ovariectomy.

Phaeochromocytoma of Adrenal Medulla.—A phaeochromocytomatous tumour of the adrenal medulla consists of adrenaline-secreting chromaffin cells, which discharge into the blood paroxysmally, though possibly also in constant small quantities. Hypertension, with periodic exacerbations to very high levels—e.g., over 300 mm. Hg, with the diastolic pressure rising to a relatively smaller extent—is the major manifestation. These vasomotor crises are due to a discharge of adrenaline into the blood stream; and other features are pallor, coldness and cyanosis of the extremities, profuse perspiration, trembling, agonizing headaches, painful constricting sensations in the chest with difficulty in breathing, angina-like pains, cramps of the calf muscles, mydriasis, albuminuria, and pyrexia. Ischaemic nephritis may also occur. The presenting features of the disorder, however, may be attacks of cyanosis, coughing and blood-tinged sputum, and pulmonary oedema; blurred vision, papilloedema, retinal haemorrhages, exophthalmos, mydriasis, and cephalalgia; epigastric pain, nausea and vomiting; an enlarged thyroid, with tachycardia; albuminuria and hypertension; attacks of coma due to hypertensive encephalopathy; hypersensitivity to heat associated with a considerably raised basal metabolic rate. The following mistaken diagnoses have been made: neurosis, neurocirculatory asthenia, thyrotoxicosis, diabetes mellitus (but severe diabetes mellitus may coexist), essential hypertension, malignant nephrosclerosis, pulmonary oedema, cerebral tumour, acute abdomen, and angina. The chief cause of such mistaken or incomplete diagnoses is the failure to realize that such a syndrome exists.

Sexual Precocity.—It is well known that sexual precocity may be associated with neoplasms of the endocrine glands, especially of the adrenals. It is less well known that the primary lesion may be a cerebral neoplasm in the neighbourhood of the third ventricle, producing its effects via the hypothalamic–pituitary mechanism, and it is probable that the classical sexual precocity associated with pineal tumours is also produced through this mechanism and not through an absence or excess of pineal gland secretion. There are sometimes, although by no means always, interesting points of clinical differentiation, but the essential point I wish to make is the overlapping of the endocrinological and neurological field. We have a similar overlapping, not well recognized, in the condition of gigantism, which does not necessarily present itself as a pathological entity, but as a variety of normality. Thus recently a mother brought her daughter of 14 to see me because the girl was easily tired and she thought it was due to her growing too rapidly. Examination of the fundi did not show the optic atrophy associated with a pituitary tumour, but the papilloedema of increased intracranial pressure, the latter confirmed by radiographs. The probability is that we are dealing with a third-ventricle tumour, and ventriculograms are being taken for further indications.

Addison's Disease.—This disorder is well known as a clinical entity, and interest has been intensified by the discovery of a potent cortical extract. But the protean manifestations of the disorder, and the fact that it is comparatively rare, lead to mistaken diagnoses, especially in fair people in whom pigmentation is minimal or absent, or in whom it is identical with that of leucodermia. Addison described one such case, and I have had three cases under my care, one ending fatally and showing atrophy of the adrenals at necropsy. I have seen a case of Addison's disease for the first time at necropsy, after the patient had been operated on because of an erroneous diagnosis of perforated gastric ulcer, the original disorder being quite unsuspected, although typical pigmentation in moderate degree was visible at the necropsy. Severe abdominal pain may be a feature of Addison's disease. Asthenia and psychoneurosis are other erroneous diagnoses met with. On the other hand, the label of Addison's disease may be incorrectly given. Thus I have had cases labelled Addison's disease in which the diagnosis was pregnancy with functional vomiting, carcinomatosis, pellagra, anorexia nervosa, and chronic arsenical poisoning. The Cutler or Kepler test of sodium and chlorine concentration in the blood and urine is valuable not so much for confirming Addison's disease as for excluding this diagnosis in a variety of disorders in which it may be suspected, often with some reason.

Simmonds's Cachexia.—The characteristics of this disorder, due to insufficiency of anterior pituitary function, are anorexia, wasting, weakness, hypotension, bradycardia, and loss of primary and secondary sexual qualities. The disorder as a complete syndrome is a rarity, but as an incomplete syndrome following pregnancy, especially with haemorrhage or infection at parturition, it is in my experience by no means uncommon, and is often missed entirely or mistaken for myxoedema. On the other hand, the condition of anorexia nervosa, which is primarily a psychoneurosis but secondarily a vitamin-deficiency and hormone-deficiency disorder, is often mistaken for Simmonds's cachexia. Clinically, the restless energy, the persistence of sexual hair, and a generalized downy growth of hair characterize anorexia nervosa, and further differentiation may be obtainable from urinary androgen assay and insulin-sensitivity curves.

Diabetes Mellitus

I refer only briefly to this condition because it is familiar to all of you, but it illustrates quite forcibly the thesis that endocrine disorders may present themselves as non-endocrine disorders in various branches of medicine. Thus it is now platitudinous to point out that the diabetic may first appear as suffering from boils, carbuncles, general pruritus, pruritus vulvae, dermatitis, xanthomatosis, neuritis, endarteritis with ulceration and gangrene of an extremity, cataract, retinitis, amenorrhoea, impotence, or infantilism, and such widespread manifestations are equally true of many other endocrinopathies.

I would suggest here that diabetes should not be arbitrarily excluded from the field of endocrinology because of the mathematical calculation of dietary values, and that those who have specialized in the field of diabetes could very appropriately extend their interests to the whole field of endocrinology. Not only has Young (1937) stirred the experimental and clinical world by the production of permanent pancreatic diabetes by injections of a pituitary diabetogenic hormone, but it has also been shown (Lukens and Dohan, 1942) that the development of this pancreatic diabetes can be prevented by insulin or diet, and can even be abolished or cured in the early stages. There is little doubt that this mechanism of producing a type

of diabetes operates clinically in man, and it is well known that diabetes may complicate acromegaly, Cushing's syndrome, thyrotoxicosis, and other endocrine disorders. It is less well known that it may coexist with Addison's disease (Simpson, 1932), or that the latter may be superimposed upon pre-existing diabetes. I have seen two such cases, one through the courtesy of Dr. R. D. Lawrence. A small number are recorded in the literature (McCullagh, 1942), and the involvement of the suprarenals may remain unsuspected. Essentially the diabetic tolerance improves and the insulin dosage is progressively lowered, but clinically the patients get thinner and weaker. Pigmentation may not be conspicuous. A study of sodium chloride metabolism confirms the diagnosis.

The Gonads

The field of gynaecology and obstetrics is saturated with, and I think overwhelmed by, the vast amount of animal experimental endocrinology and therapeutic indications deduced therefrom. Several books have appeared on the endocrinological aspects of, or endocrine therapy in, gynaecology. Unfortunately species differences often invalidate application of the results of animal experiments to man, and, on the whole, endocrine therapy in this field has been tantalizingly promising but somewhat disappointing. Potentially it remains a very fruitful source of further study. Neither should one limit attention to the more obviously pathological—such as the endocrine concomitants—or aetiological factors in eclampsia. Physiological aberrants are equally important. Thus the increasing adiposity that follows each pregnancy in those with an unstable endocrine constitution is almost certainly associated with failure of involution of the physiological pituitary and adrenal hyperplasia, and the persistence of adrenal androgen secretion is often indicated by an accompanying mild but definite hirsutism.

The brilliant results of oestrogen therapy in the vasomotor and psychoneurotic disturbances of the climacteric are too well known to bear repetition, but it is not generally realized that such disturbances may persist for ten or more years after the menopause or may return after a long interval of freedom, or may supervene for the first time ten years after the menopause, just as they may occur in the late forties in a woman who has been completely ovariectomized in the second or third decade of life.

In the male the treatment of sterility by gonadotrophic hormone or small doses of androgens is far from satisfactory, but the treatment of hypogonadism in the surgical castrate or eunuchoid is dramatic. Also, excellent physical and mental improvement has occurred in a group of cases showing juvenilism in the presence of apparently normal genital function. Impotence due to organic hypogonadism always responds to androgenic therapy, but psychological impotence calls for psychological treatment.

Parathyroids

Hyperparathyroidism, due usually to an adenoma of one of the parathyroid glands, is primarily an endocrine disorder, but its manifestations are in the main skeletal, the general decalcification and rarefaction of bones resulting in bony deformities, spontaneous fractures, and variable bone pains. Previous to the discovery of the function of the parathyroids and knowledge of the high serum calcium, low serum phosphorus, and negative calcium balance in this condition, the disorder was often confused with osteitis deformans and more localized forms of rarefying osteitis. I have recently seen a case in a woman of 40 who first had a localized bony swelling of the tibia removed, the histological report being osteoclastoma. It was only some months later that the underlying condition was recognized, and a parathyroid tumour sought for, found, and removed. This patient also had multiple renal calculi (calcium deposits)—which reminds one that these patients may first present themselves to the urogenital surgeon with renal colic or haematuria; or, if the calcium deposition is generalized (calcinosis), there may be severe renal insufficiency and uraemia. In such cases the inadequate excretion of phosphorus blurs the chemical picture.

Hypoparathyroidism appears to be more common in Denmark than in this country. It may be due to atrophy or degeneration of the parathyroids or may follow thyroidectomy for thyrotoxicosis in a small percentage of cases, interference with blood supply being apparently at least as important as inadvertent removal of parathyroid glands. In addition to the characteristic tetany (associated with a low serum calcium and high serum phosphorus) there may be various cerebral and mental disturbances, with epileptiform convulsions, changes in character, hallucinations, and dementia. It is known that patients have been treated as idiopathic epileptics for years (as has been the case with hypoglycaemic attacks resulting from pancreatic islet tumours). Hypoparathyroidism may also present itself in the first place as a trophic disturbance of the skin, hair, nails, teeth, or eye lenses (cataract). Thinning or loss of hair, impetigo herpetiformis, acrodermatitis continua, psoriasis pustulosa, and various ill-defined eczematous lesions have been found associated with hypoparathyroidism, and have apparently responded to calcium and calciferol therapy. Lachmann (1941) states that migraine, cardiac pain with palpitations, and gastro-intestinal spasm severe enough to lead to laparotomy may be presenting features in unsuspected hypoparathyroidism.

Thyroid Gland

The diagnosis of thyrotoxicosis, primary or secondary, is relatively easy, yet it is surprising how often the condition is missed, even when the manifestations are characteristic, and especially when the presenting feature is not obviously endocrine. The cardiologist's awareness of thyrotoxicosis as one cause of tachycardia, auricular fibrillation, or angina-like pain is now taken for granted, and more recently attention has been drawn to the possibility of a small group among hypertensive cases being thyrotoxic in origin. It is perhaps less well realized that anginal pains, cardiac insufficiency, and electrocardiographic changes may have myxoedema as their background. The pulse is usually slow in myxoedema, but may be rapid in the presence of cardiac insufficiency. The capillaries also show characteristic narrowing and absence of tortuosity.

Gastro-intestinal symptoms may be severe in thyrotoxicosis, and I have seen a necropsy on one patient who was operated on for a "query perforated gastric ulcer," the diagnosis at operation having been changed to acute pancreatitis, the pancreas being very congested. I have also seen a necropsy on a patient who was admitted in semi-coma with the diagnosis of "query intracranial haemorrhage, query concussion, with cerebral irritability," when the patient was really in the terminal stages of a thyrotoxicosis crisis. I have seen several cases of "idiopathic wasting, query malignancy" in older people with unsuspected secondary thyrotoxicosis who recovered a few stone in weight following thyroidectomy.

Asthenia is commonly present in thyrotoxicosis, and rarely myasthenia gravis may coexist, but thyrotoxicosis may be wrongly diagnosed as myasthenia gravis or progressive muscular atrophy. Neurocirculatory asthenia may be associated with enlargement of the thyroid gland, but it is coincidental, and an erroneous diagnosis of thyrotoxicosis has led to a useless thyroidectomy.

Psychoneuroses and the Psychoses

Endocrinopathies are more often associated with psychoneuroses than with psychoses, but the latter may coexist with, or be precipitated by, endocrine disorders—e.g., manic-depressive disorders, paranoia, delusional insanity in thyrotoxicosis, myxoedema, chronic hypoparathyroidism, chronic hypoglycaemia, and the climacteric. Hemphill and Reiss (1940) recognize a type of involutional melancholia associated with adiposity and scanty or absent menstruation which they claim responds to oestrogen therapy; and a hypo-ovarian–hypo-adrenal type which is said to respond to corticotrophic hormone. A cautious approach to the problem is called for, and a critical evaluation of cause and effect is essential, but it is interesting to note that many years ago Mott drew attention to the degeneration of the testes in dementia praecox.

It is my opinion that all endocrinopathies, constitutional or more obviously pathological, influence behaviour pattern, and that the association of mild or severe psychoneuroses with untreated endocrinopathies is very frequent. This is obvious with thyrotoxicosis and the climacteric, for example, but I have seen a transformation of personality follow adequately treated Addison's disease, eunuchoidism, and even hyperparathyroidism. The important point is that a group of psychoneuroses and psychoses coming to the psychiatrist in

the first case may have an underlying endocrinopathy as an aetiological factor.

Endocrines and Ophthalmology

In 1938 Sir Walter Langdon-Brown gave a lecture to the Oxford Ophthalmological Congress reviewing the ocular manifestations of endocrinopathies as they present themselves to the ophthalmologist. Parathyroid, pineal, pituitary, thyroid, adrenal medullary, gonad, and pancreatic disorders may all show ophthalmological signs, and these may for a time be the presenting feature.

Endocrines and Cancer

Experiments in small animals, such as mice, indicate that oestrogens in large doses over long periods may induce neoplastic growth in genital and other organs. Thus Allen (1942) records cancer of cervix uteri (mice), uterine fibromyomas (guinea-pigs), mammary cancer (mice), interstitial cell tumours of the testis (mice), adenomatous tumours of the pituitary (rats and mice), tumours of the suprarenal cortex (mice), and osteogenetic transformations of bones including tumours (mice). Such neoplastic changes are not found in monkeys, and there is no clinical evidence of the endocrines being responsible for malignant changes in the genital or other organs in man.

Endocrine Therapeutics in Non-endocrine Disorders

Hormones have been used with success in a number of non-endocrine disorders. Thus insulin is anabolic in some thin people, and recently Sargant (1942) has found it useful in a group of neurotics who have lost much weight and have broken down after a long period of stress, showing "a peculiar mixture of anxiety, hysterical, and reactive depressive symptoms." Insulin has also been used in the vomiting of pregnancy and in thyrotoxicosis. Insulin-shock therapy is apparently more beneficial than electric-shock therapy in early schizophrenia. It is claimed that cortical extract has proved of value in surgical shock and shock from burns, the blood chemistry in both instances having some similarity with that of Addison's disease. Apparently the corticosterone carbohydrate influencing factor is more important than the desoxycorticosterone factor. In infections the adrenal cortex loses lipoid and undergoes congestion and degeneration. Cortin has therefore been advocated for the acute stages of a variety of infections, especially malignant diphtheria, and for post-infection debility. It is also said to be of value in meningococcal septicaemia of infants, as is illustrated in the Waterhouse-Friderichsen syndrome. Oestradiol appears to be of value in a group of menopausal rheumatoid arthritics. Testosterone I have found of value (Simpson, 1938) for its anabolic nitrogen-retaining effect in hyperthyroidism associated with much wasting. It has also been used for menorrhagia and mastitis. Both testosterone and stilboestrol are effective in suppressing lactation. Adrenaline is of course specific in asthma. Pitressin has been used for chronic pyelitis, and in obstetrics.

Conclusions

I think we must conclude from the above review that the manifestations of endocrine diseases extend throughout the whole domain of medicine, including in that term surgery and gynaecology and the various "special" branches of medicine; that endocrine disorders do not necessarily appear as complete syndromes; and that unless an awareness of the possibilities is present they may remain unrecognized as endocrinopathies when the presenting feature is not obviously endocrine. In the opposite direction one sees a tendency to ascribe the origin of obscure chronic disease, especially of a functional character, to endocrine disorders which are not really present, and the necessity for a knowledge of existing methods of differentiation and the development of more specific chemical, metabolic, and biological tests.

Endocrinology, however, viewed from any angle, is no longer merely a lusty infant. It has grown to maturity, and is at least as well founded on scientific data as many other older accepted specialties. I doubt whether it would gain from the founding of a special hospital for its study—rather would it tend to flourish as special centres or clinics in large hospitals, remembering that such centres for accumulating clinical material from large areas are essential for progress in this field. Such centres or clinics, however, must not be auxiliary adjuncts in the charge of assistants, created merely to give an air of modernity or progress. Endocrinology is one of the most difficult specialties. Its practice, and even more so its teaching, require wide general clinical experience and judgment, as well as personal experience and continuous familiarity with the enormous and ever-widening field of experimental research and a specialized knowledge of endocrinopathies, which can only be obtained by those who have had special facilities and opportunities for their study. An endocrine clinic should be an important integral part of a hospital, and should serve as a model for modern methods of investigation, research, and therapy in disease.

REFERENCES

Allen, E. (1942). *Endocrinology*, **30**, 942.
Callow, R. K. (1938a). *Proc. roy. Soc. Med.*, **31**, 841.
—— (1938b). *Lancet*, **1**, 435.
Crooke, A. C. (1935). *J. Path. Bact.*, **41**, 339.
Cushing, H. (1932). *Johns Hopk. Hosp. Bull.*, **50**, 137.
Hemphill, R. E., and Reiss, M. (1940). *J. ment. Sci.*, **86**, 1065.
Lachmann, A. (1941). *Acta med. scand.*, Suppt., **121**, 1.
Langdon-Brown, W. (1938). *Trans. ophthal. Soc.*, **57**, 454.
Lukens, F. D. W., and Dohan, F. C. (1942). *Endocrinology*, **30**, 175.
McCullagh, E. P. (1942). *Clev. clin. Quart.*, **9**, 123.
Sargant, W. (1942). *British Medical Journal*, **2**, 574.
Simpson, S. L. (1932). *Quart. J. Med.*, n.s., **1**, 99.
—— (1934). *Proc. roy. Soc. Med.*, **27**, 383.
—— (1936). *Trans. med. Soc. Lond.*, **59**, 36.
—— (1938). *Post-grad. med. J.*, **14**, 144.
—— de Fremery, P., and Macbeth, A. (1936). *Endocrinology*, **20**, 363.
Young, F. G. (1937). *Lancet*, **2**, 372

USE OF AMPHETAMINAE SULPHAS IN FACILITATING ELECTRICALLY INDUCED CONVULSIONS

BY

K. C. BAILEY, M.D., D.P.M.

Deputy Medical Superintendent, St. James Hospital, Portsmouth

The use of electricity for inducing convulsions in the treatment of mental disorders has revealed a significant factor in connexion with the electrical stimulus. The electrical convulsion threshold has been found to vary, so that not only do successive applications of electricity require increasing strengths of current, but also there is a wide variation in the initial effective amount necessary. In some patients, more noticeably those suffering from certain types of disorder, a very high threshold either obtains from the outset or rapidly develops. In view of the possibility that electricity, particularly in high strengths, may not be altogether harmless, it seems desirable to discover methods by which the electrical convulsion threshold may be lowered. This to some extent may be achieved by increasing the interval between successive treatments, but at least in the cases exhibiting a high initial threshold recourse cannot be had to this method. Moreover, the period of the treatment would be much prolonged. Other ways of achieving the same objective are suggested by the fact that certain drugs have a stimulating effect on the cerebral cortex, and, owing to the results obtained with amphetaminae sulphas (benzedrine sulphate), experiment in the use of this drug was thought likely to be effective, and was therefore undertaken. Before the results of this procedure are examined it is profitable to consider the theoretical basis of this ascertained variation in the electrical convulsion threshold.

So complex has the nomenclature in psychiatry become, and so difficult is it to fit cases into definite disease entities, that it is often more useful to consider symptom-complexes. Particularly is this so in relation to therapeutic measures.

Variations in Cerebral Activity in Psychotic Disorders

Certain types of psychotic disorders exhibit the symptom of diminution of motor activity. This occurs particularly in depression and in schizophrenia. It may be of any degree from lassitude and a disinclination to do anything to apathy and even stupor. When such a prominent feature presents

itself, it is pertinent to seek a reason for it, particularly when it occurs in such widely different types of mental disorders as manic-depressive and schizophrenic psychoses. In the former there is a true depression with often suicidal tendencies; in the latter there is an absence of emotional tone, with a consequent apathy. Both of these lead to a diminution of activity, which in an extreme degree is manifested by stupor. A consideration of the stupor reveals two different types—that occurring in depression being more often of the anergic type, in which there is a loss of muscular tone and in which mental processes such as perception, memory, and ideation appear to be in abeyance; whereas that occurring in schizophrenia is usually of the resistive katatonic type. Here there is a retention or even an increase of muscular tone, causing the posture of the patient to remain as arranged, undetermined by gravity, and the mental processes are not in abeyance, so that mannerisms and stereotypy occur and outbursts of excitement and impulsive behaviour interrupt the stupor. Apparently in the anergic stupor the cerebral activity is lowered so that there is a diminution of sensory stimuli to, and a reduction of more impulses from, the brain, with an associated paucity or lack of motor function. On the other hand, in the stupor associated with schizophrenia there is a retention of the muscular tone and cerebral activity as shown by mannerisms, stereotypy, and impulsive behaviour. Thus the mechanism of the two conditions appears to be entirely different—that associated with depression being due to a reduction of cerebral activity, and that occurring in schizophrenia being due not to a reduction of cerebral activity but to failure of integrity.

Causes of Lowered Cerebral Activity in Depression

From these observations it is possible to conjecture about the likely causes of this lowered cerebral activity which occurs in cases of depression. One such view has already been advanced—namely, that it is due to inhibition of cerebral function. Thus Pavlov (1941), who attempted to apply his findings in animal experiments to mental disorders, considered that in depression there was a state of positive inhibition, which with advancing years ceased to be effective, so that the patients with depression and diminished motor activity in earlier life became excitable and unrestrained in their behaviour when old age overtook them.

This supposition that cerebral activity is diminished in these cases of depression appears reasonable, and it was hoped that, with the induction of fits by the electrical method of Cerletti and Bini (1938), the measurement of the resistance of the head preparatory to applying the shock current would be an indication of the cerebral resistance and inhibition. This, then, would be not only a useful guide to the effective amount of current required to produce a fit, but an index to the degree of cerebral inhibition in different mental states. Unfortunately this hope was not realized, and, although the factors responsible for this head resistance are not yet completely understood, enough data are available to connect it with changes in the skin and underlying structures. Thus Krause (1936) found that the resistance of impedance of the head depends on the skin, muscle, and periosteum, and that no difference occurred when the brain was replaced by a wet sponge. That the skin is the most important of these factors is the opinion of McGregor (1941) and Walter (1942), which is supported by the fact that the resistance is appreciably lower in hypoglycaemic states, when there is excessive sweating, than when the skin is dry. Atmospheric conditions also appear to affect the resistance, as, of course, does the degree of contact of the electrodes. Thus the measurement of the head resistance is no measure of the resistance of the brain, and certainly the apparatus supplied on the Solus machine is inadequate for this purpose. Hence any hope of using the measure of the head resistance as a guide to the degree of cerebral resistance, and therefore of inhibition, was not possible. Hemphill and Walter (1941) experienced the same difficulty when assessing the effect of epanutin in relation to electrically induced fits. They considered that the product of the voltage and the time of application of the current was a more useful index of cerebral resistance.

Shortly after the use of the electrical method to induce fits a great variation in the electrical convulsion threshold was found, and as in the case of the chemical methods, using cardiazol and triazol, a tolerance developed which raised the threshold. Besides this, however, different individuals varied widely, even in the initial threshold. The reason for this was not at first understood, but careful observation has shown it to depend upon two main factors—age, and the type of mental disorder. Naturally other factors may also operate to some extent, such as the difficulty, already mentioned, of the exact diagnosis, and the degree of contact of the electrodes. Nevertheless the following tables appear to be most suggestive.

TABLE I.—*Showing Variation of Average Electric Convulsion Threshold (expressed as the Product of Volts and Duration of Stimulus in Relation to Age, in 110 Patients, irrespective of Type of Mental Disorder*

Age Group :	16–20	21–25	26–30	31–35	36–40	41–45	46–50	51–55	56–60	61–65
Average V. × T. ..	18·3	20·2	23·2	23·4	24·4	26·9	28·9	30·9	34·5	42·1
No. of patients ..	10	8	17	23	8	3	11	16	9	5

TABLE II.—*Showing Relation of Average Electric Convulsion Threshold to Type of Mental Disorder, and Average Age of Each Group*

Diagnosis:	Schizophrenia	Depression	Delusional	Obsessional	Toxic	Mental Defect	Mania
V. × T.	21.9	29·5	26·9	20·9	20·4	23.6	24
No. of cases ..	32	55	7	9	4	2	1
Average age of each group (years) ..	27·8	46	44	30·8	29·5	23	46

From Table I it is seen that the electric convulsion threshold increases with age. This suggests that an organic factor is operating. This is unaffected by sex, since the average threshold for females as compared with males is 26.9 to 24.7 in 110 cases, of which 75 were females and 35 were males. From Table II it is apparent that this threshold is increased in cases of depression as compared with other types of mental states, and that the average age for these cases of depression is the highest of any of the groups. This is significant, for it suggests that the increased threshold in cases of depression depends more upon age than on the actual mental state. It is still necessary, however, to attempt to discover why the threshold should increase with age and why depression should be more common in later life. One might surmise that organic changes occur with increasing age that make the cortex of the brain more resistant to stimuli, with correspondingly increased inhibition, and that when a certain degree of inhibition is present a state of depression occurs. This would explain the lack of adaptability and the dislike of change which occur in later life, and thus supports the theory advanced by Pavlov. Certainly the increased threshold is not due to the depression itself, for it does not occur in all cases, being more commonly found in the older depressed patients—between 40 and 60—as may be seen by comparing the average threshold in depressed patients younger than 40 with those over 40. It was 23.1 and 33 respectively. Further, if the raised threshold depended upon the depression, it should tend to become lower as improvement occurred. This was not found, and even if the condition of tolerance, which itself raises the threshold, tended to some extent to mask any lowering of the threshold due to the mental improvement, this latter must be extremely small or it would, at least, have compensated for the rise due to the tolerance. The increased electric convulsion threshold appears, therefore, to be brought about by changes in the cerebral cortex as a result of age, which at first are reversible but which later become irreversible, as seen by the lack of response to treatment in the more chronic cases.

Tests with Amphetaminae Sulphas

If, as has been suggested, the increased electric convulsion threshold is due to changes in the brain, they should be capable of modification by drugs known to act on the brain. It is now common knowledge that sedative drugs, such as the barbiturates, by depressing cortical activity, increase the electric convulsion threshold, as shown by Hemphill and Walter (1941) in the case of disodium diphenyl hydantoinate. It was therefore

considered useful to test the effect of a cerebral stimulating drug on the electric convulsion threshold, and in view of the improvement that occurs from amphetaminae sulphas (benzedrine sulphate) alone in certain cases of depression, it was decided to employ this drug. Accordingly 5 mg. was given by mouth to each patient, to test their susceptibility, and thereafter 10 mg. was given one hour before the electrical treatment. The results in 6 patients are tabulated below:

Case I, aged 56

No. of T'ment:	1	2	3	4	5	6	7	8	9	10	11	12
Volts × Time ..	26	45	48	80	80	75	75	75	45	24	24	24
Milliamps of current passed ..	30	81	104	225	250	162·5	175	200	78	35	28	26
Amphet. sulph. in mg.									5	10	10	10

Case II, aged 42

No. of T'ment :	1–16	17	18	19	20	21	22	23	24	25	26
Volts × Time	26	39	26	45	45	45	45	30	30	45	45
Milliamps of current passed	30	93	32	78	87	87	93	38	35	99	78
Amphet. sulph. in mg. ..			5		10	10	10	10	10		

Case III, aged 54

No. of T'ment :	1–4	5	6–8	9–19	20	21	22	23	24
Volts × Time	26	52	48	52	36	26	26	26	26
Milliamps of current passed	29	104	112	122	82·5	35	33	35	34
Amphet. sulph. in mg. ..					5	10	10	10	10

Case IV, aged 62

No. of T'ment :	1	2	3–10	11	12	13	14
Volts × Time	24	24	45	60	30	60	60
Milliamps of current passed	30	30	86	109	38	120	147
Amphet. sulph. in mg. ..				5	10		

Case V, aged 52

No. of T'ment :	1	2	3	4	5	6	7	8	9
Volts × Time	45	45	30	30	45	39	39	39	39
Milliamps of current passed..	105	87	40	40	102	67·5	72	75	72
Amphet. sulph. in mg. ..			5	10	10	10	10	10	10

Case VI, aged 44

No. of T'ment :	1	2	3	4	5	6	7	8	9	10–14
Volts × Time	12	12	12	26	28	28	14	14	42	42
Milliamps of current passed	9·5	7·5	10	35	36	34	9.5	9.5	75	69·5
Amphet. sulph. in mg. ..						5	10	10		

Comments on Results

In Case I it is obvious that amphetaminae sulphas produced a lowering of the electrical convulsion threshold, as measured by the product of the volts and duration of the stimulus: it was reduced from 75 to 45 with 5 mg. and to 24 with 10 mg. A corresponding reduction occurred in the milliamperes of current passed.

In Case II the threshold fell from 39 to 26 with 5 mg.; but 10 mg., two treatments later, failed to achieve any effect; three treatments later the threshold fell to 30 on two occasions, but rose again to 45 when the drug was discontinued. A possible explanation of the absence of effect of the drug in treatments 20, 21, and 22 may be that a phase of tolerance was developing which masked the effect, for 5 mg. had previously been effective.

Cases III and VI are good examples and require no explanation. The immediate rise in the threshold when the drug is discontinued is seen in Case VI.

In Case IV some explanation is required, for the threshold increased when 5 mg. of the drug was given. The reason for this is that a too optimistic lowering of both the volts and the length of the stimulus was made, so that it was reduced from 150 volts and 0.3 sec. to 120 volts and 0.1 sec., and five further shocks had to be given before arriving at the effective shock of 150 volts and 0.4 sec. This meant that the factor known as "extinction phenomenon" came into play. After the brain has been stimulated, a phase of negativity develops so that stimulus of greater strength must be given to be effective. This phase lasts 1/2 to 1 hour, so that if the stimuli are given in quick succession the effective amount of current is much greater than if an interval had been allowed between the shocks. On the next occasion, however, when the strength of the current was not altered and only the duration was changed from 0.3 to 0.2, it was effective. The threshold rose again when the drug was omitted.

Case V at first showed a lowering of the threshold, but two treatments later this rose again, and it is likely that tolerance was developing.

In every case, therefore, a reduction of the electrical convulsion threshold occurred, and even in Case II, when it did not occur until the drug had been given on four consecutive occasions, it was eventually reduced below the level obtaining before the drug was given.

Mode of Action of Amphetaminae Sulphas

The manner in which amphetaminae sulphas stimulates the brain is not clear, but since it resembles ephedrine very closely it might be assumed that it acts similarly. Gaddum (1938) has suggested that ephedrine acts in conjunction with adrenaline by a process known as "substrate competition," by which the amine oxidase which is thought to be present in the so-called adrenergic nerves destroys adrenaline, just as choline esterase destroys acetylcholine in the so-called cholinergic nerves. On this supposition it may be assumed that amphetaminae sulphas performs a similar function and that its action is central rather than peripheral.

The effect of other substances on cortical activity has been investigated, and Miller, Stavraky, and Woonton (1940) believe that acetylcholine and physostigmine salicylate, which have a stimulating action on the cortex, exert their effect by a similar process of "substrate phenomenon," the physostigmine preventing the destruction of acetylcholine, since a stronger stimulation results when they are given together than when given separately. Atropine inhibits their action, as it does that of all choline esters. McKail, Obrador, and Wilson (1941) and Williams and Ritchie Russell (1941) confirmed the cortex-stimulating action of these substances and considered that they acted centrally rather than peripherally, for respiratory, blood, sugar, and acid-base changes showed no real effect.

The question of the influence of the change in blood pressure on cortical activity has been studied by Beecher, McDonough, and Forbes (1938), who found that a fall of blood pressure was accompanied by a diminution of electrical activity, whereas McKail, Obrador, and Wilson found that sodium nitrite and amyl nitrite stimulated the cortex. These conflicting findings suggest that the blood pressure has little or no action on cortical activity. The blood pressure was examined in the cases reported here, and readings were made before and one hour after the administration of the amphetaminae sulphas. They are as follows:

	Before	After
Case II	150/80	130/70
„ IV	140/90	160/100
„ V	210/120	240/120
„ VI	160/98	166/110

How far these changes were operative it is not possible to say, but in view of the findings already reported it is possible that they were not so important as the central effect. This is the view of Miller (1937) in the case of physostigmine salicylate, the effect of which was local, facilitating transmission through the cortical synapse, the threshold being reduced.

Summary and Conclusions

On the basis that the initial electrical convulsion threshold varies in different individuals, that a condition of tolerance during treatment occurs resulting in a rise of the threshold, that amphetaminae sulphas is one of a group of drugs which have the property of stimulating the cortex, and that it seems desirable to retain a reasonably low threshold and thus limit the strength of the electrical stimulus, the question of the

cause of the heightened threshold in certain types of cases was raised. Assuming that the diminished motor activity associated with depression is due to increased cerebral inhibition, in contrast with that which occurs in schizophrenic disorders, a heightened electrical convulsion threshold might reasonably be expected to result from this inhibition. Now, it is shown by this investigation that cases of depression generally have a higher threshold than cases of other disorders. Investigation also showed that the threshold increased with age, and as depression itself is more commonly found in older age groups there are two possibilities: (*a*) that certain forms of depression raised the threshold *per se*, or (*b*) that age alone has this result. It is impossible to say definitely which factor operates the more strongly, or, indeed, whether the age factor is not really the determinant of the psychosis.

Amphetaminae sulphas, being a known cortical stimulant, was utilized in an attempt to lower the electrical convulsion threshold; in this it was found to be effective, and smaller strengths of electricity could be used.

As regards the mode of action, considerations were discussed showing the likelihood that it exerts its effect centrally rather than by any accompanying peripheral changes, such as the heightened blood pressure. The possibility of the achievement of the central action by a process of "substrate competition," as suggested by Gaddum in the case of ephedrine, was advanced.

In two cases there was some post-convulsion excitement. This was never very great, and may not have been due to the drug, since such excitement has been present after the convulsion when the drug was not employed. No other undesirable effects were observed from the use of the drug: even in the patient with a blood pressure of 210/120 no harm appeared to result with the doses given.

I am indebted to Dr. Thomas Beaton, medical superintendent, St. James Hospital, Portsmouth, for his kind permission to publish this investigation and for his help and interest in it.

REFERENCES

Beecher, H. K., McDonough, F. K., and Forbes, A. (1938). *J. Neurophysiol.*, **1**, 324.
Cerletti, U., and Bini, L. (1938). *Boll. Accad. Med. Roma*, **64**, 36.
Gaddum, J. H. (1938). *British Medical Journal*, **1**, 713.
Hemphill, R. E., and Walter, W. G. (1941). *Lancet*, **1**, 446.
Krause, W. (1936). Quoted in *Zbl. Physiologie*, **102**, 38.
McGregor, J. S. (1941). M.D. thesis.
McKail, R. A., Obrador, S., and Wilson, W. C. (1941). *J. Physiol.*, **99**, 312.
Miller, F. R. (1937). Ibid., **91**, 212.
—— Stavraky, G. W., and Woonton, G. A. (1940). *J. Neurophysiol.*, **3**, 131.
Pavlov, I. (1941). *Lectures on Conditioned Reflexes*, vol. 2, London.
Walter, W. G. (1942). *J. ment. Dis.*, **88**, 306.
Williams, D., and Ritchie Russell, W. (1941). *Lancet*, **1**, 476.

ACUTE DISSEMINATED LUPUS ERYTHEMATOSUS: RECOVERY WITH SULPHANILAMIDE

BY

J. E. G. PEARSON, D.M., M.R.C.P.

Hon. Physician to the Connaught Hospital; Assistant Physician in the E.M.S.

The following case is reported because few records have been found of successful treatment of acute lupus erythematosus with sulphanilamide.

Case History

The patient, a married woman, first attended the Middlesex Hospital Dermatological Department in 1933, at the age of 31. She showed lesions of chronic lupus erythematosus on the cheeks, hands, and sternal region which had developed after sunbathing 4½ years previously. During this period she had suffered from toxic hepatitis and anaemia following arsenical treatment for her skin complaint. There was no family or personal history of tuberculosis. Constant supervision and treatment at the Middlesex Hospital included several courses of quinine iodobismuthate intramuscularly, quinine and stovarsol tablets by mouth, and injections of gold thiosulphate, which had to be discontinued owing to a febrile reaction with a rash after the fourth injection. With this treatment her skin condition was kept well under control.

On July 25, 1940, the patient was admitted as an emergency to an E.M.S. hospital. A few days previously she had been taken suddenly ill with acute dissemination of her rash. On admission her temperature was 100.4°, pulse 90, and respirations 20. There was a diffuse patchy erythema, affecting chiefly the cheeks, nose, upper lip, neck, and limbs, some of the lesions showing scaling; the finger-joints were swollen, stiff, and painful; and there was generalized lymphadenopathy, most marked in the cervical glands. In the first 8 days 27 g. of sulphapyridine were administered, and though she felt better, her temperature, which remained swinging, had risen to 103°, and she had more extensive joint pains. Many original skin lesions had faded, but numerous others had appeared, some being discoid in nature.

On the ninth day a macular rash, becoming confluent in places, started on the neck, thighs, and trunk, and rapidly became diffuse: although it was thought to be an erythematous phase of her lupus, the possibility of drug rash was considered, and as the sulphapyridine had evidently had no beneficial effect it was discontinued. A blood culture taken on the fifth day proved sterile apart from a contaminating *Staph. albus*, and a blood count showed red cells 4.5 millions, Hb 86%, leucocytes 7,500 (neutrophils 63%, lymphocytes 37%).

Her condition rapidly deteriorated, and on the twelfth day she was very drowsy, her cerebration was slow, and the temperature reached its peak of 105.4° and remained between 104 and 105° for 36 hours. Pulse 110-124; respirations 24-28. She became completely irrational and delirious, and the tip of the spleen was easily palpated. The position was desperate, and it was decided to attack a possible streptococcal infection anew.

A drip blood transfusion of 1 pint initiated intravenous therapy, and during the next 8 days she received intravenously 21 pints of glucose-saline, 35.5 g. of soluseptasine, and 50 c.cm. of pentnucleotide, with daily intramuscular injections of 6,000 units of antistreptococcal serum. She became rational again, but was very weak, and a stomach tube for feeding purposes was necessary for a further 10 days. During the four weeks after the start of her intravenous treatment she received the following: 35 g. of soluseptasine (first week) and 93 g. of sulphanilamide (last three weeks); 225 c.cm. of pentnucleotide intravenously or intramuscularly; and 144,000 units of antistreptococcal serum intramuscularly. Apart from a few chronic lesions her rash faded completely; her arthropathy disappeared; her haemoglobin fell from 92% to 57%; daily white cell counts showed an almost constant leucopenia, the lowest being 2,500; and almost all her hair fell out. When a rise of temperature to 101°, with a macular drug rash on the trunk, occurred at the end of this period, a blood transfusion of two pints appeared to do good, and a steady recovery followed, although a mild attack of rubella caused a slight scare. The only possible septic focus discovered during her stay was pyorrhoea affecting five teeth in the lower jaw. Extraction was purposely postponed until July, 1941, when it was performed uneventfully.

In Dec., 1941, a tuberculin patch test proved negative, but within five days she had a recurrence of her arthropathy and lymphadenopathy. These subsided under sulphanilamide treatment without any spread of her skin lesions, but further tuberculin tests were considered unjustifiable. Apart from this setback she has remained in apparently good health since her acute attack.

Discussion

Barber (1941) considered that chronic lupus erythematosus can be produced by reaction either to the tubercle bacillus or to a streptococcus; Kelvin (1941) implied that tuberculous toxin can be held responsible for all cases. It is difficult to believe that the latter theory accounts for many of the acute forms of the disease. Sequeira (1927) certainly said that evidence of tuberculosis, including acute miliary and glandular types, could be found in about two-thirds of the patients, but also stated that "the possibility of a non-tuberculous origin of some cases must not be overlooked." Roxburgh (1933) went further in attributing five deaths to streptococcal septicaemia. This termination with or without acute endocarditis has come to be recognized, and although it cannot be taken to prove that the streptococcus is the cause of the whole clinical picture, it is at least suggestive, and is presumably the reason why the sulphonamides were first given a therapeutic trial in this condition. Success has been reported in a small proportion of the patients so treated in America by Weiner (1940), Wile and Holman (1940), and Hopkins (1941), sulphanilamide being the compound chiefly used. In four of the fatal cases on which necropsies were performed tuberculosis was conspicuous by its absence, while a variety of acute lesions were encountered, including pericarditis, pleurisy, splenitis, and glomerulo-tubular nephritis.

Although the aetiology of the condition is not clear, further trial of sulphanilamide therapy is urged for the acute forms of lupus erythematosus without clinical evidence of tuberculosis. In view of the leucopenia accompanying the condition, the simultaneous administration of pentnucleotide seems to be indicated.

I wish to thank Dr. Henry MacCormac for his encouragement, and for permission to publish this case, for which I am also grateful to Surg. Rear-Admiral Whiteside, medical superintendent.

REFERENCES

Barber, H. W. (1941). *Brit. J. Derm. Syph.*, **53**, 1, 33.
Hopkins, H. H. (1941). *Arch. Derm. Syph.*, Chicago, **43**, 833.
Kelvin, J. (1941). *Lancet*, **2**, 597.
Roxburgh, A. C. (1933). *Brit. J. Derm. Syph.*, **45**, 95.
Sequeira, J. H. (1927). *Diseases of the Skin*, 4th ed., London.
Weiner, A. L. (1940). *Arch. Derm. Syph.*, Chicago, **41**, 534.
Wile, U. J., and Holman, H. H. (1940). Ibid., **42**, 1059.

Medical Memoranda

An Improved Pappenheim Stain for Detection of Gonococci in Smears of Pus

In 1938 Sandiford described a malachite green–pyronine counterstain for use in Gram's method. He stated that with it pus cells were bluish green, gonococci bright red, and Gram-positive cocci purple-black. It was in fact a modification of the original Pappenheim and Saathof stain (Pappenheim, 1899), which consisted of methyl green, pyronine, ethyl alcohol, phenol, and glycerol. Walton (1936) used the Pappenheim formula recommended by Conn (1929) and got good results in the examination of smears for gonococci; but Sandiford (1937) could not reproduce them, possibly because he used the original Pappenheim formula. Sandiford found that bacteria and cells and their nuclei were not well differentiated on account of a violet coloration, and in 1938 suggested that this coloration was a metachromatic effect due to the presence of methyl violet as an impurity in methyl green. He therefore substituted malachite green.

According to Conn, methyl green is largely used in stain technology for its metachromatic effect, and is actually crystal violet into which a seventh methyl group has been introduced. This seventh methyl group is very loosely attached and thus there is always some methyl violet present, either because it is not all converted into the higher homologue (methyl green) or because it has broken down. In order to obtain pure methyl green Conn suggested that the commercial dye should be shaken up with chloroform, in which substance methyl violet is soluble.

Walton (1938-9) increased the stability of Pappenheim's stain by incorporating in it methyl alcohol instead of ethyl alcohol. He held that methyl alcohol by virtue of its extra CH_3 groups prevented the seventh methyl group of methyl green from dissociating itself.

THE NEW METHOD

In preliminary work at the Liverpool laboratories it was found that Pappenheim's stain deteriorated within a week even after the substitution of methyl alcohol, and gonococci stained more of a violet colour than a red. It was decided, therefore, to shake up methyl green with chloroform before incorporating it in the Pappenheim stain; this resulted in stabilization of the stain. In the method now used a 1% aqueous solution of methyl green is shaken in a separating funnel for a few minutes with about one-third of its volume of chloroform. The chloroform becomes deep violet and is discarded after separation. A modified Pappenheim solution is then prepared which has the following composition:

Methyl green (Gurr), chloroform-treated, 1% ..	100 c.cm.
Methyl alcohol, absolute	10 c.cm.
Pyronine G (Gurr)	0.6 g.
Phenol	1.0 g.
Glycerol	20 c.cm.

The solution is allowed to mature for 24 hours and is then filtered into a dropping-bottle before use. The optimum staining period is 1/2 to 1 minute.

If used as a counterstain in Gram's method for smears of pus, Gram-positive organisms stain normally and gonococci brilliant red. Most other Gram-negative organisms are a less intense red. Nuclei of the leucocytes are bright blue, but the cytoplasm of the polymorphonuclears behaves differently from that of the mononuclears. The cytoplasm of the latter is red, whereas that of the former is unstained. Endothelial cells have blue nuclei and a cytoplasm of a variable pink.

Sandiford found that the phenol in Pappenheim's solution, normally 2 g. in 130 c.cm., tended to decolorize Gram-positive bacteria after more than 2 minutes, and therefore omitted it from his modification. This fact was confirmed by me, and 1 g. of phenol was substituted. With this amount the decolorizing action was minimized, although it was of little importance because the staining period was much shorter than that used by Sandiford. The staining intensity of Pappenheim's solution is lessened if phenol is omitted.

In a comparison of Sandiford's modification of Pappenheim's stain with that described by me it was found that gonococci were more distinctly red by the latter and easier to detect against the clear unstained background of the polymorphonuclear cells. Moreover, the contrast of the brilliant-red gonococci and the bright-blue nuclei by my modification was greater than that by Sandiford's, with which gonococci were red and the pus cells green with bluish-green nuclei.

The modified Pappenheim stain here described was primarily intended for use in the examination of smears for gonococci, either directly or as a counterstain, but it is very suitable for blood films, particularly in the differentiation of the mononuclear leucocytes. The stain is also excellent for cerebrospinal fluid containing meningococci, and any amount of pyronine from 0.5 to 1 g. will yield good results.

The keeping quality of the modified stain has not yet been determined, but it is longer than 3 months and the solution is effective after Sandiford's has begun to deteriorate.

MAXWELL M. BARRITT, M.Sc., D. Bact., L.M.S.S.A.
Assistant (Acting City) Bacteriologist, Liverpool Corporation.

REFERENCES

Conn, H. J. (1929). *Biological Stains*, pp. 109, 119, New York.
Pappenheim, A. (1899). *Virchows Arch.*, **157**, 19.
Sandiford, B. R. (1937). *J. Path. Bact.*, **45**, 467.
—— (1938). *British Medical Journal*, **1**, 1155.
Walton, S. T. (1936). *J. Bact.*, **31**, 61 (abstract).
—— (1938–9). *J. lab. clin. Med.*, **24**, 1308.

The Vitamin C Saturation Test

This test, as modified by Harris and Abbasy (*Lancet*, 1937, **2**, 1429), affords useful and reliable information concerning the vitamin C reserves of men. During my year as lieutenant in the R.A.M.C. I carried it out on 1,200 soldiers according to a scheme drawn up by the Directorate. I performed several thousand titrations, and in the first tour each involved the usual simple calculations, taking into account the period of retention, the volume of the sample of urine, the burette reading, and the variable strength of the reagent—2:6-dichlorophenol-indophenol. These were tedious. The following is the procedure followed in the second tour; it is described here because it saved so much time both in the titrations and calculations.

As before, the men were dosed with 0.75 g. of ascorbic acid in water at 7.30 a.m. They emptied their bladders at 10.30 a.m., and a two-hour period of retention was adhered to rigorously. This is better than three hours, which in winter is too long. The samples were collected at 12.30 p.m. in numbered 2-lb. jam-jars, and instead of measuring the volume, which for 100 samples took about 1½ hours, each sample was made up to 500 or 1,000 ml. with tap-water. While an assistant did this, 10 ml. was pipetted off from each and run into a 6-oz. medicine bottle, numbered on shoulder and on cork. These bottles had previously received 1 ml. of glacial acetic acid.

This method obviates the addition of large quantities (30 to 50 ml.) of reagent in titrating the more concentrated urines. By taking 2.20 ml. of acidified sample for titration (namely, 2 ml. of urine), using a pipette graduated to the tip, with reagent adjusted so that 1 ml. was equivalent to 0.1 mg. of the pure vitamin, convenient readings were obtained. These were around 0.2 ml. for the initial low values of the first day, rising finally to about 6 to 8 ml. Saturation was taken to be when 50 mg. was excreted in a 3-hour period, or correspondingly for two hours. It is convenient to use the numbered corks to identify the 2-ml. portions removed to test-tubes for titration.

The reagent was adjusted to correspond to 0.1 mg. of vitamin, using 100-mg. portions weighed before the tour (*not* a bought tablet or a 1-g. tube as sold—these are not prepared as standards, and do not justify the implicit faith in their exactness that one sometimes finds). Tap-water had to be used, but this introduced no appreciable error. The standard must be titrated immediately after preparation.

The method appears to be entirely reliable, and will differentiate groups of men living under slightly different conditions. This may best be appreciated by plotting the number of daily doses required to saturate on the vertical axis and the number of men saturated by that day on the horizontal axis; namely, the sum of those saturated on first, second, and third days—say 60%—would be plotted at 60 for third day. Another way of assessing is to plot for each group the number unsaturated on some selected day; this shows up deficiencies. Thus, for example (an entirely hypothetical case), suppose one group of men had 5% remaining unsaturated after six doses and another had 50%, the difference could be strikingly shown in a graph. If, however, the two groups were close together they might best be differentiated by choosing a smaller number of doses for a comparison. Thus two groups which gave the same percentage of unsaturated after, say, five doses might be separated by one of them having a larger number unsaturated after four doses.

Marine Biological Laboratory, Plymouth. W. R. G. ATKINS, Sc.D., F.R.S.

Reviews

TUBERCULOSIS STUDIES FROM U.S.

Modern Aspects of the Anti-tuberculosis Program. By J. Burns Amberson, Kendall Emerson, Wm. Charles White, and Louis I. Dublin. University of Pennsylvania Bicentennial Conference. (Pp. 38. 3s. 6d.) Philadelphia: University of Pennsylvania Press; London: Oxford University Press. 1941.

The four papers in this booklet were read at the University of Pennsylvania Bicentennial Conference and all will repay close study. Dr. J. Burns Amberson's subject is the "Evaluation of the Early Lesion in the Clinical Approach to the Control of Tuberculosis," and his remarks on the management of the early lesion discovered by routine radiological examination are significant. "The only choice, therefore, if the physician and patient wish to accomplish maximum results at the most opportune time, is to treat these newly developed lesions promptly and carefully [bed rest for several months being essential]. Promptness is of the greatest importance. The rapidity of some of the early changes indicates that the ultimate fate of many patients is determined within a few days or weeks after the first diagnosis." Dr. Amberson bases this conclusion on clinical investigation during the past ten years among nurses, medical students, house officers, and other hospital personnel, details of which are shortly to be published. It supports the view of those who maintain that any worthwhile results from mass radiography will be obtained only if the examinations are repeated at relatively short intervals and enough beds are available for the effective rest treatment of those discovered to have active lesions. To quote Dr. Amberson again, "... a freshly developed pulmonary lesion is not merely a mechanical problem to be solved by a mechanical means. The very development of the lesion is an indication of inadequate resistance which only time and rest treatment can restore most effectively and surely. To ignore this is to neglect the greatest bulwark against relapse in later years, and it is the physician's duty to take the long view."

Dr. Emerson's discussion of "Tuberculosis Control from the Point of View of a Voluntary Public Health Agency" will be of less interest to readers in Great Britain, where much of this work is the function of local authorities. "The Place of Medical Research in the Anti-tuberculosis Campaign" is described by Dr. White, chairman of the Committee on Medical Research of the National Tuberculosis Association. Planned systematic research in tuberculosis is not very conspicuous in this country, and the National Tuberculosis Association in U.S.A. may well be proud of its record. Finally, Dr. Dublin, of the Metropolitan Life Insurance Company, discusses "The Outlook for the Eradication of Tuberculosis," mainly in the U.S. It is perhaps carrying simplification too far to consider that the tuberculosis problem "largely simmers down to the discovery of cases and to providing adequate care and treatment for the cases when discovered." On the other hand, we agree that "there has been altogether too much hesitation and complacency with respect to tuberculosis as a disease to be conquered. There is good evidence that tuberculosis will not be much more difficult to eradicate than have been other communicable diseases. But we must attack it with the same energy, skill, and forethought that we have employed against diphtheria or typhoid fever."

It was a good idea to publish the four papers in this form, for in these 38 pages there is indeed *multum in parvo*.

SURGICAL TREATMENT

Textbook of Surgical Treatment, Including Operative Surgery. Edited by C. F. W. Illingworth, M.D., Ch.M., F.R.C.S.Ed. (Pp. 528; illustrated. 28s., plus 8d. postage.) Edinburgh: E. and S. Livingstone. 1943.

This textbook of surgical treatment is compiled by eighteen Scottish surgeons under the editorship of Prof. C. F. W. Illingworth of Glasgow. It is of comfortable size, is well printed in clear type, and covers the field of general surgery well; specialties such as rhino-laryngology and gynaecology are not included.

Surgical treatment implies rather more than operative surgery, and while giving due prominence to the operation, which is usually the central and great event in surgical management, this book deals also with the pre-operative and post-operative care of patients, and also with the conservative treatment of surgical conditions for which operation is not required. In this sense, therefore, it is rather a practical guide to surgical case management than a textbook of operative surgery, and in order to keep the size within reasonable limits descriptions of operations have for the most part been confined to details of single procedures rather than to a variety of methods which are so often put before one in books on operative surgery. For this reason, however, there will not be general agreement with all the procedures advocated. Inconsistencies are bound to occur in such a work as this, and while Knight's name is mentioned in connexion with sympathectomy for cardiospasm, Oldham and Rogers, whom we associate with renal sympathectomy and sympathectomy for supra-oesophageal spasm respectively, are given no mention. We should have liked to see more illustrations: such as there are, especially the line drawings, are good, but there could with advantage be more of them in certain sections; some, such as "Affections of the Bladder and Urethra," are well illustrated, while others are lacking in this respect.

This is a well written, sound, and essentially modern textbook which we predict will prove popular and run into future editions. It will be valued, we believe, not only by medical students in the Scottish schools, to whom it will of course have special appeal, but by students throughout the English-speaking world.

STOIC PHILOSOPHY IN VERSE FORM

Marcus Aurelius: A Rendering in Verse. By John Lyth. Preface by Prof. Gilbert Murray. P.E.N. Books. (Pp. 29. 2s.) London: George Allen and Unwin, Ltd. 1942.

Those, in Prof. Gilbert Murray's words, "who have felt the magical beauty of Fitzgerald's *Omar Khayyám* must sometimes have wondered whether some more adequate and less helpless philosophy would not yield a similar harvest of poetry."

Dr. Lyth has presented in rhythmical form the essence of the Stoic philosophy as Marcus Aurelius interpreted it in actions and words. No doubt the genial influence of Horace, to say nothing of our own Landor and Peacock, makes men of literary tastes think more kindly of Epicureanism than Stoicism. But we must remember that Horace's noblest characters were Stoics, and Stoicism, practical Stoicism, the creed of most of the world's noblest characters. Dr. Lyth's charming verses often remind us of this:

> Live out thy life as at thy journey's end;
> But if mayhap men prove too strong for thee
> Then get thee gone, nor dream thy death to be
> The greatest trial which the gods can send.
> I quit this room, whose smoke gives me offence—
> Is this a matter of great consequence?

One remembers: "But you also, judges, must regard death hopefully and must bear in mind this one truth, that no evil can come to a good man either in life or after death, and God does not neglect him. So, too, this which has come to me has not come by chance, but I see plainly that it was better for me to die now and be freed from troubles."

In these times Dr. Lyth's poetry will bring comfort and a quiet mind to many readers, and even a sense of pride that so many, neither philosophers nor emperors, have been faithful to their ethical creed, even unto death.

Notes on Books

We welcome the fifth edition of one of the well-known Edinburgh "Catechism Series"—Part V, *Anatomy*, which comprises the thorax and lymphatic system (E. and S Livingstone; 1s. 6d.). This has been enlarged and revised by Mr. C. R. WHITTAKER, and it has the characteristic feature of brevity combined with clarity which distinguishes the series in general. The part now under consideration will be of value to students who wish to revise the essential points in the anatomy of the thorax and lymphatic system and owing to the mode of presentation—Question and Answer—it will assist them to focus their attention on those facts which should be known for examination purposes. It will also serve to impress firmly on the mind knowledge which has already been obtained through dissection and classwork, and, so to speak, register it in the brain in such a way that it will be available when, later on, it is required in ordinary practice. The book is not illustrated and makes no claim to originality or to the recording of any of the latest advances in scientific work. The inclusion of such matter is, however, outside the intention of what is primarily designed for the use of the average student and to help him to concentrate his attention on well-established and fundamental facts, a knowledge of which is essential for the practice of the medical profession.

Preparations and Appliances

IRON LUNG IMPROVISED IN A WARSHIP

Surg. Lieut.-Cmdr. A. C. K. YATES, M.B., Ch.M., F.R.C.S.Ed., R.N.V.R., writes:

The following is an account of the improvisation of a Drinker apparatus on board H.M.S. *Hermione* and the result of collaboration with the S.M.O. of H.M.S. *Ark Royal* after manufacturing a similar unit.

On Oct. 26, 1941, an able seaman was transferred from H.M.S. *Hermione* to the local military hospital suffering from follicular tonsillitis and was placed in close contact with another patient who was found later to have developed acute anterior poliomyelitis. The latter patient was transferred to the Colonial Hospital, where it was found necessary to place him in a Nuffield iron lung (the only one in the locality). A few days later the A.B. also developed symptoms and signs of acute anterior poliomyelitis. He rapidly showed signs of paralysis and began to experience respiratory embarrassment. At this stage H.M.S. *Hermione* was visited by the medical liaison officer of the port, who requested on behalf of the hospital authorities that 12 to 15 hands from the ship should be held in readiness for immediate call to carry out artificial respiration. Also, it was suggested that H.M.S. *Hermione* should attempt the manufacture of an iron lung, as the only available one was in use and it was doubtful if a further supply would reach the port in time. The warrant shipwright was consulted, and he, with two shipwrights and a blacksmith, was accompanied to the Colonial Hospital to inspect the Nuffield iron lung in use. It was the first occasion any of the shipwright's party had ever seen the apparatus, and after making a few sketches and notes they returned to the ship and immediately set to work, using only materials available in the workshop, with the exception of a sorbo-rubber neckpiece (which we could have improvised) obtained from the hospital. In 14 hours they produced a replica of the original, their work being completed at 2 a.m. An experimental subject was then placed in the apparatus, which was found to answer perfectly.

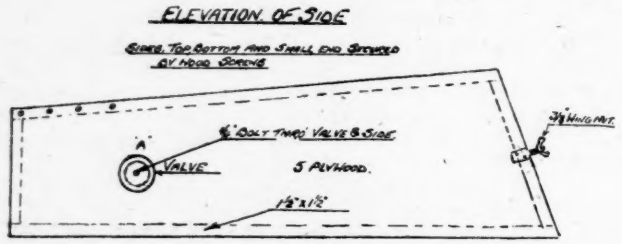


FIG. 1

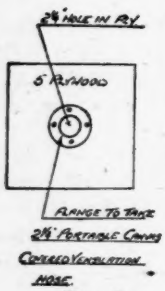


FIG. 2

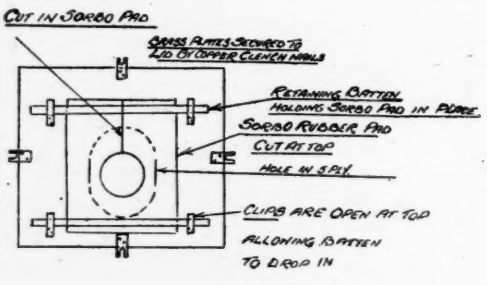

CUT IN SORBO PAD
GRASS PLATES SECURED TO LID BY COPPER CLENCH NAILS
RETAINING BATTEN HOLDING SORBO PAD IN PLACE
SORBO RUBBER PAD
CUT AT TOP
HOLE IN 5 PLY
CLIPS ARE OPEN AT TOP ALLOWING BATTEN TO DROP IN

FIG. 3

After consultation between *Hermione* and *Ark Royal* we have come to the following conclusions: first, that from the experience of these two cases it is obvious that a unit, sufficient for the immediate purpose and at little expense, can be put together in a very short time; secondly, that the unit can be made from materials readily available in H.M. ships, shore establishments, and probably also in civil institutions which have their own workshops. The following are particulars of the apparatus:

The body is made of five-ply boards secured to 1½ in. by 1½ in. fillet pieces. The hose joining bellows to body should be of a non-collapsible variety—a length of portable ventilation hose which is wire-stiffened inside is very suitable. The hose should be approximately 6 ft. in length to allow pumping to be done in an adjacent room. The bellows should be 2 ft. in diameter, with a rise and fall of at least 9 in. The bottom of the bellows is pulled by handle towards the top, the top of the bellows being secured to a suitable platform 14 in. high, for the man to stand on when pumping. If time permits, four vertical guide rods should be fitted to ensure that the bottom of the bellows rises and falls vertically, thus making pumping easier. A stretcher-board of five-ply should be fitted inside the bottom of the body of the unit, running the whole length, and have two rope beckets at the entrance to enable it to be withdrawn easily when the patient is in the unit. A shaped mattress to fit this board should be made. The action of the relief valve is similar to that on a Service respirator.

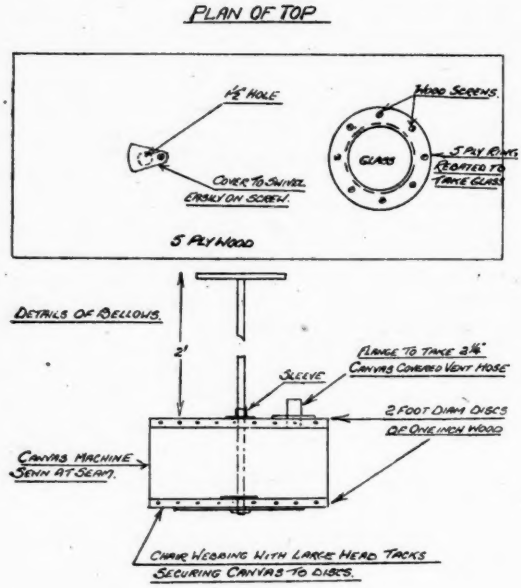

PLAN OF TOP
1½" HOLE
HOOD SCREWS
GLASS
5 PLY RIMS REBATED TO TAKE GLASS
COVER TO SWING EASILY ON SCREW
5 PLY WOOD
DETAILS OF BELLOWS
2'
SLEEVE
FLANGE TO TAKE 2¾" CANVAS COVERED VENT HOSE
2 FOOT DIAM DISCS OF ONE INCH WOOD
CANVAS MACHINE SEWN AT SEAM
CHAIR WEBBING WITH LARGE HEAD TACKS SECURING CANVAS TO DISCS

FIG. 4

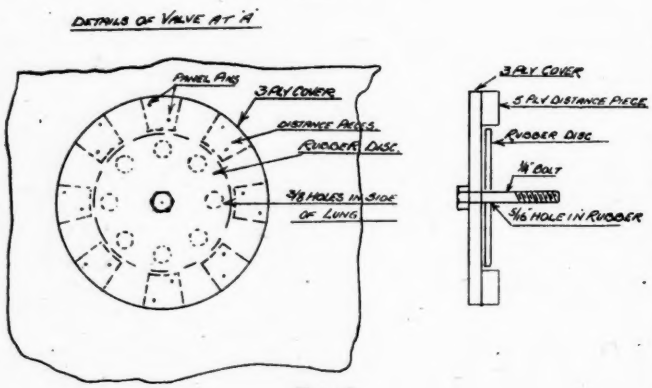


FIG. 5

Pumping is done by relays of men, four to a watch of four hours, each man having 15 minutes' duty every hour and 45 minutes off duty. These men did this easily and without fatigue.

This work, although primarily of medical importance and under medical supervision, was done entirely by the shipwrights of both ships with a little assistance from each ship's engineering department, and it is due to them that these jobs were completed so efficiently and in so short a time. We are indebted to them also for the technical details and drawings. I am also indebted to Surg. Cmdr. McCoull of H.M.S. *Ark Royal* for his co-operation in this report.

BRITISH MEDICAL JOURNAL

LONDON

SATURDAY FEBRUARY 27 1943

THE KING'S FUND

Although the title was proposed by its first royal President, King Edward's Hospital Fund for London (or the Prince of Wales's Fund, as it was called at first) is not very happily named. "King's Fund" suggests nothing more than a gilt-edged banking account, and the Fund is much more than a collecting and distributing agency. It has been for forty-five years an integral part of the hospital service of London, the buttress of voluntaryism in the South of England, has shaped hospital policy, and has prompted or assisted many developments which are now commonplaces in the institutional care of the sick. Above all, it has vastly broadened the basis of public support for hospitals. When it began its work not one person in a hundred contributed to these institutions. A Fund under royal auspices—its President must always be the son, brother, or grandson of the sovereign—was able to call forth magnificent donations from imperial financiers and Indian princes, but it also called forth the modest guineas of the middle class and even the shillings and sixpences of the poor, for it was largely at the instance of the Fund that the Hospital Saving Association for London was founded in 1923.

To commemorate the service of the Fund in five reigns a short and very readable history has been prepared.[1] Apparently it was Edward VII himself, then Prince of Wales, who conceived the idea of the Fund as a memorial of his mother's sixty years' reign, though there are other figures in the background, notably Sir Alfred Fripp and Sir Henry Burdett, who may have whispered a word in the royal ear. The preliminary discussion at Marlborough House in 1897 was attended by dukes, bishops, bankers, and Members of Parliament, also by Lord Lister and the Presidents of the Royal Colleges. Lord Lister was the only medical man on the general committee of ten members appointed to work out details. The first object of the Fund was to secure from £100,000 to £150,000 in annual subscriptions from people who were not already contributing to hospitals. The plan was not altogether welcomed by the hospitals themselves. The prospect of additional revenue was pleasing enough, but they feared that ancient liberties would suffer, that concentration of services, perhaps amalgamations, would be forced upon them. The future Edward VII was a philanthropist, but he was a great stickler for efficiency, and the hospitals of those days, in their administration, were, frankly, inefficient. They were jealous for their isolation, they were competitors for the purse of the charitable, and the idea of working together or profiting from common experience was remote. At that time, although there were rate-aided workhouse infirmaries, the municipal hospital had not arisen to challenge and stimulate voluntary effort. The first grants made by the Fund may well have exacerbated the feeling. Guy's, which at that time was falling down, received £6,000, and the London £5,000, but Charing Cross, Middlesex, King's College, and St. Mary's received only £1,000 each, and St. Bartholomew's, happy in its endowments, nothing at all. The benefactions were at first made to hospitals within a seven-mile radius from Charing Cross; it was on the proposal of Lord Lister that the radius was extended to nine miles; and now the area is conterminous with the metropolitan police district, with a population of 8,500,000 and 168 voluntary hospitals.

At the time when the Fund began its work 687 hospital beds in London had been closed for lack of means. Within a year 185 of them were reopened, and a few years later there were no closed beds at all. Another critical period came after the end of the last war, when, in the aggregate, the expenditure of London hospitals was exceeding their income by 10%, and there was a prospect of the wholesale closing of wards. It was at this time that the first Minister of Health, Dr. (now Lord) Addison (never "Sir Christopher Addison," as this brochure calls him), appointed the Cave Committee, on the recommendation of which the King's Fund functioned as the Voluntary Hospitals Committee for London. Largely because of the Fund, both for its direct grants and the enthusiasm it inspired, the aggregate deficit was wiped out by 1924, and there was a surplus of £227,000. Well might the Prince of Wales (afterwards Edward VIII), speaking at a special meeting of the council in that year, ask whether anyone could now suppose the voluntary system to be dead or dying. The annual distributions of the Fund rose from £50,000 at the end of the reign of Queen Victoria to £150,000 at the end of the reign of Edward VII, and when George V died they had been £300,000 for each of the last three years.

But, as we have tried to make clear, the Fund has been far more than a mere treasure chest. Among the achievements which are to be placed to its credit are the encouragement of pay beds (it promoted the Voluntary Hospitals (Paying Patients) Act, 1936), a better organization of the out-patient system, the improvement of deficient radium supplies at London hospitals, the establishment and maintenance of a nursing recruitment centre, a pension scheme for nurses and hospital officers, a uniform system of hospital accounting, an amelioration in hospital routine whereby patients were wakened at a later hour, more rapid admission of urgent cases, leading to the foundation of the Emergency Bed Service, now dovetailing into the Emergency Hospital Scheme, and a reduction in the number of hospital flag days from seventy-seven in the year to two, without loss of revenue. The Fund took a leading part in the discussions which followed the Local Government Act, 1929, with a view to working out principles of co-ordination between voluntary hospitals and the new municipal and county service. It was a pioneer in this field, for although its concern is for voluntary hospitals, yet the chairman of the London County Council, the head of the greatest municipal hospital authority in the world, has always been a member of its general council. In the new era of co-operation between these services which has been forecast by the present Minister of Health the Fund will no doubt find new tasks to fulfil. Some might have supposed that such a Fund had no history, only a succession of balance-sheets, but that is far from being the case, and this little book forms a useful footnote to the annals of social progress in our time.

1 *King Edward's Hospital Fund for London, 1897-1942.* By Frank D. Long. (The Fund Offices, 10, Old Jewry, E.C.2.)

UNPADDED OR SKIN-TIGHT PLASTER SPLINTS

In a recent legal action against a medical man for alleged negligence in the treatment of a forearm fracture, confusion was caused by the use of the term "skin-tight" as applied to a plaster splint, and by statements quoted from authorities purporting to show that encircling plaster bandages were to be condemned. The term "skin-tight plaster" is used not for a tight plaster but for one which is applied direct to the skin. Unpadded, or so-called skin-tight, plasters were reintroduced by Böhler of Vienna as an economy measure during the last war, when there was

a scarcity of cellulose and other padding materials in Austria. He found that when such bandages were evenly applied the risk of constriction was no greater than with padded plasters, and that the risk of pressure sores occurring beneath them was, in fact, less, because of the more perfect moulding which was possible round the contours of the limb. For the same reason the immobilization of fractures was found to be more perfect by the unpadded plaster method. Tension within a fractured limb normally rises an hour or two after the injury, the rise being due to vascular damage and haematoma formation. For this reason some surgeons have advocated delay in reduction until swelling is maximal. The disadvantages of this are, first, that it is more difficult in some cases to get satisfactory reduction, and, secondly, that the fragments are apt to slip apart when the swelling has subsided inside the plaster splint. These difficulties are avoided if the fracture is reduced before swelling has occurred and a plaster splint is applied immediately, but the drawback here is that the plaster does not permit swelling beneath it, and, therefore, relative venous and lymphatic obstruction is apparent in swelling of the peripheral portions (fingers and toes) of the limb left uncovered by the plaster.

A third possibility is to use a temporary splint lightly bandaged until the swelling has subsided, and wait several days until reduction can be performed. Even then the manipulative procedure is apt to cause fresh swelling within the plaster cast and the same careful after-treatment is required. Delayed reduction of this sort has its own risks where a severely displaced fracture may produce important vascular or nervous complications. Rise of tension with a well-applied plaster is, therefore, to be considered normal, and is not much less with a padded plaster than with one that is unpadded; it is a great disadvantage of any plaster technique, however perfect. Elevation of the limb reduces the tension by diminishing the flow of arterial blood into it, and helps lymphatic absorption and venous drainage. Should rise of tension become dangerous in spite of elevation, further relief can be obtained by splitting the plaster and subjacent padding (if any). The presence of swelling peripheral to a plaster splint is thus of itself no indication that the splint has been incorrectly applied. Obviously, therefore, the fact that the surgeon has ordered a plaster to be split is not an admission that he has applied the plaster wrongly in the first instance. Nor can anyone who has not seen the case in the acute stage decide whether a particular surgeon was right or not in applying a plaster before natural swelling either had occurred, become maximal, or had subsided. The judgment of "the man on the spot" is paramount, and he himself must be judged upon the consideration he has given to the problem in the light of the skill and attention that can reasonably be expected of him.

As to the methods suitable for the application of unpadded plaster splints, it is necessary to draw attention to statements which to the layman, and particularly the lawyer, appear conflicting. This is important, because two well-known textbooks both give details that are confusing. Böhler, for example, states that "the use of encircling (roller) plaster bandages without padding is to be strictly forbidden on account of the danger of pressure sores." On the same page he then describes a method of applying plasters as follows: "First of all a plaster splint (slab or flat) is applied and over this an encircling bandage. This must not be taken to imply a circular plaster bandage in the old sense. The plaster bandage should not be drawn tight but only lightly applied." Later in the book, when dealing with Colles's fracture, he describes a method by which a plaster slab 6 in. wide is applied to the extensor surface, moulded carefully round the limb, and completed by a calico bandage; but he adds that "care must be taken that the starch bandage is not applied too tightly, because in contrast to the plaster bandage it contracts on drying." Watson-Jones, in his discussion on plaster technique, gives in a series of pictures and their legends a method in which a slab on the extensor aspect of the wrist is completed by a wet open-wove bandage. On the next page he describes the complete plaster-cast technique, in which "one or more slabs are carefully moulded in position with a wet, soft bandage," and finished by the application of an "ordinary plaster bandage in a circular manner." Both writers, therefore, approve the carefully applied encircling plaster bandage over one or two slabs.

There is a possibility that one or other of the statements may be taken to uphold a view which was not intended by the author. Used intelligently and with adequate care, single plaster slabs or double plaster slabs with encircling plaster or encircling gauze bandages are all recognized and approved procedures. Those who are in a position to teach plaster technique must see to it that students (and this includes medical practitioners) appreciate the need for precision in the application of these methods and the importance of adequate supervision and proper after-treatment. Finally, we would urge the adoption of the adjective "unpadded," which is less misleading than "skin-tight."

DOCTORS AGREE ABOUT PASTEURIZATION

The correspondence that followed the moderately worded leader on pasteurization of milk in the *Journal* of Dec. 19 showed once again that pasteurization is one of those subjects that tend to generate more heat than light. It is a great pity that medical men who oppose pasteurization support their case by misstatements of fact, or by ignoring those facts which are available to anyone who will take the trouble to spend an hour or two in a medical library. It is a pity, because their misstatements and ill-informed views are given much prominence in a press often enough, unfortunately, more anxious to please certain interests than to get at the truth of the matter. It has frequently been said that the first line of health defence in this country is the general practitioner, and perhaps too little credit has been given to him for the daily advice and instruction he gives his patients on all matters of health and hygiene. But with so little time at his disposal, the G.P. cannot be expected to sift the scientific evidence in books and medical periodicals on behalf of the pasteurization of milk. While it may seem to him to be self-evident that if you want to prevent 2,000 children dying every year from bovine tuberculosis you should prevent the bovine bacillus from reaching the child population of this country, the stubborn—but apparently humane—opponents of this obvious public health measure seek to trip him up by specious arguments. With a few exceptions the doctors of this country agree—and have agreed for a number of years—that pasteurization is essential. So that medical men may have the facts at their finger-tips, we have asked Prof. Selby Wilson to put the gist of the matter in the form of question and answer. If every doctor in practice were to keep his patients and influential people in the locality in which he works informed of the facts presented in Prof. Wilson's admirable summary, then in time that indefinite thing called "public opinion" might be able to overcome the powerful vested interest which by its opposition has been responsible for the deaths of thousands of children through bovine tuberculosis, not to mention the suffering and crippling caused in those who survive this and other infections conveyed by milk.

The situation was summarized pithily by Sir Alfred Webb-Johnson at a deputation from the British Medical

Association which was received last week by the Minister of Food, when he said that the Government as controllers of the organization and sale of milk had a moral responsibility to take adequate steps to prevent infection from it. Lord Woolton has a great respect for facts and for the opinion of experts; it is because of this that the conduct of his Ministry has received such unstinted praise. The medical profession are glad that he has taken this trouble to be informed about the pasteurization of milk. The statements made by the influential deputation, introduced to the Minister last week by Prof. R. M. F. Picken, are published elsewhere in this *Journal*. We hope that every medical man will read Prof. Wilson's article and the account of the deputation, and, armed with this ammunition, will carry the war energetically into the enemy's camp—that is, the camp of those who oppose pasteurization.

THE CARE OF THE NEWBORN

Two inquiries into the incidence of breast-feeding, one relating to children in welfare centres and the other to children in the casualty and out-patient departments of a city hospital, have lately been made in Birmingham, and the statistical results and conclusions are given in a report issued by the British Paediatric Association. In the "welfare" group between four and five thousand records were obtained through the co-operation of health visitors. The conclusions of the health visitors are that the incidence of breast-feeding has not been materially altered by the present emergency, with its large demands for female labour. In areas where married women have not been accustomed to work in the factories they are still not entering such employment while they have a baby under one year; and where they have been accustomed to work in factories they return to such employment at no earlier date—that is to say, they wait until the baby is at least two months old. Influences which affect breast-feeding are said to be the shopping queues, part-time work, emotional disturbances (such as anxiety concerning a husband on war service), and, above all, the action of the doctor. The doctor is said to be more responsible than any other single factor for weaning babies, taking babies off the breast whenever there is any difficulty. But on the whole it is considered that infants are now better cared for than they were in peacetime, largely because munition workers are now getting higher wages. Of 2,698 "welfare" infants, the proportion who continued to be breast-fed after three months was 39% in the case of first babies and 42.7% in the case of second or later children. The inquiry into the condition of babies seen at hospital with their mothers covered a much smaller group, and a group which obviously had to be divided into the "sick" and the "well." Of the babies in the "sick" category nearly 20%, and of those in the "well" category 34%, were breast-fed after the third month. Several interesting conclusions are reached from the voluminous statistics presented, but the most interesting is that when the results are compared with those of a similar inquiry made in 1938 it does not appear, at least in Birmingham, that weaning is associated with the mothers' employment in industry.

The British Paediatric Association has also issued a report of its subcommittee on neonatal mortality. It is stated that immaturity accounts for about 50% of neonatal deaths, but that this usual death rate can be reduced to below 20% by special paediatric care, supported by skilled nursing in suitably equipped units. The report urges the setting up of a "premature unit" in every maternity hospital and in all large children's hospitals, the unit to be in charge of a paediatrician possessing experience in neonatal work. Of the other causes of neonatal mortality, the second to be mentioned is birth trauma, the prevention of which is a problem for obstetricians, general practitioners, and midwives. The incidence of asphyxia neonatorum could probably be reduced by a higher standard of ante-natal care and by consultations with obstetricians and physiologists on the question of analgesics and sedatives and on that of methods of resuscitation. Another set of problems is concerned in the reduction of incidence of infective and toxic conditions among the newly born. This is held to be largely a question of nursing. Neonates, particularly those who are premature or suffer from congenital weakness, and therefore are particularly prone to infection, should not be herded together. They should be in a special unit designed on the cubicle system. The subcommittee suggests that a committee of paediatricians, obstetricians, and public health experts should be set up to discuss the various aspects of neonatal mortality and morbidity, especially the health of the pregnant woman, the relative advantages of domiciliary and institutional confinements, and the encouragement of breast-feeding. On this last point it urges that breast-milk banks or "pools" should be set up in maternity hospitals or other suitable centres. Another recommendation is that the Central Midwives Board should include at least one paediatrician, and that the final examination for the C.M.B. certificate should include questions, set by a paediatrician, on neonatal care.

PROGESTERONE AND VITAMIN E

Recent efforts to reduce neonatal mortality may cause us to forget that the problem of habitual abortion, although much less urgent, still awaits solution. Vitamins and hormones are apparently both implicated, but the evidence is somewhat contradictory Recent published work[1 2 3] in German journals suggests that a combination of the corpus luteum hormone (progesterone) and vitamin E is particularly beneficial. Certainly the figures, although small, are suggestive, and indicate the need for further study. Since it is possible that some of the abortions are due to hormonal dysfunction, while others are the result of vitamin E deficiency, combined therapy would naturally be more beneficial if patients from both categories were included. There is some evidence, however, that vitamin E exerts its effect by acting through the ovarian hormones. Thus, a resting thyroid gland can be activated either by follicular hormone or by vitamin E, but the latter is inactive in castrated animals. Stähler and his co-workers,[4 5] impressed by the potentiating action of vitamin E on progesterone, have attempted to analyse this effect. This they have done by determining the dose of progesterone required in young rats and rabbits to complete the uterine cycle which had been initiated by oestradiol benzoate. There appeared to be little doubt that much more progesterone was necessary when no vitamin E was given. The potentiating effect did not appear until the fifth day of vitamin therapy and was not maximal until the thirteenth. The results of oral administration were more marked than were those of injection of an oily solution. As for the action of vitamin E on other gonadal hormones, it was found to have a slight potentiating effect on oestrogens, but did not increase the production of prolan A or lead to any histological changes in the anterior pituitary. Vitamin E did not significantly alter the growth curve in rabbits, but progesterone caused an increase in weight proportional to the dose. In rats, on the other hand, vitamin E led to a transient loss of weight which was greater than

1 *Arch. Gynäk.*, 1940, **170**, 142.
2 *Ther. Gegenw.*, 1940, **81**, 11.
3 *Klin. Wschr.*, 1940, **19**, 263.
4 *Arch. Gynäk.*, 1941, **171**, 118.
5 Ibid. p. 134.

that accompanying complete starvation. It also favoured the production of corpora lutea in rats, but in rabbits, although the follicles became more fully developed, they did not reach the luteal stage. These facts show the need for caution in applying to one species the experimental results obtained in another. This is further demonstrated by the fact that in rats glycogen appeared in the endometrium as a result of progesterone action, while in rabbits it was often present without this hormone. It is obvious that the action of vitamin E on the endocrine system is a complex one, and much must still be done before the interrelationship is clarified. The effect of combined hormone and vitamin therapy has still to be determined, and individual case reports, while possibly of interest, merely cloud judgment. The next steps must be further experimental work, and, even more important, the accumulation of a sufficient number of carefully controlled clinical observations from ante-natal clinics and maternity hospitals.

INCUBATION PERIOD IN TUBERCULOSIS

The problem of tuberculosis control might be greatly simplified if the onset of the primary infection were associated with a generalized rash. Unfortunately erythema nodosum only occasionally helps, and even this association is not recognized widely enough at present. It is not surprising, therefore, that the incubation period of tuberculosis is seldom discussed, although attempts, recently summarized by Wallgren,[1] have been made to investigate it in the past. He lays down certain criteria for estimating the incubation period—that is, the interval between infection with tubercle bacilli and the first appearance of the primary tuberculous lesion. Wallgren found in the literature only 13 cases which fulfilled these criteria. He has added 23 of his own, and divides the 36 cases into two groups: (1) those in which the end of the incubation period and onset of allergy could be determined only by means of tuberculin tests; and (2) those in which the end of the incubation period was determined by manifestations of primary tuberculosis. In this second group were cases with "initial fever" and erythema nodosum and cases with fever but no erythema nodosum. Each of these subgroups was divided again into patients who later developed clinical signs of primary tuberculosis, and those in whom the diagnosis was established only by a positive, following a negative, tuberculin test in relation to the erythema nodosum and/or "initial fever." The 36 cases were also classified into (*a*) those in which contact could definitely be assumed to have taken place for no longer than a day (13 cases), and (*b*) those in which the contact covered a period of two days to two weeks (23 cases). Only in (*a*) could the incubation period be determined with accuracy, and analysis of the case reports showed that it was under 30 days in one case, 30 to 35 days in three, 35 to 40 days in five, 40 to 45 in two, 46 to 50 days in one, and over 50 days in one. The incubation periods in the other 23 cases, allowing for a minimum period of contact of two days and a maximum of three weeks, are indicated in the following table:

	Incubation Period (Days)									
	< 15	15–20	20–25	25–30	30–35	35–40	40–45	45–50	> 50	Total
Minimum number of cases ..	1	4	1	6	1	7	3			23
Maximum number of cases ..			2	1	4	3	6	6	1	23

From these findings it can be concluded that, although the incubation period is variable and may rarely be under two weeks or more than seven weeks, in most cases it is four to seven weeks. The practical importance of this in connexion with the examination of contacts and tuberculin testing is obvious.

[1] *Arch. Kinderheilk.*, 1941, **124**, 1.

SILICOSIS IN SWEDEN

All those interested in silicosis will find Torsten Bruce's study of the extensive investigations he carried out into the incidence of the disease in various industries in Sweden both timely and helpful.[1] Altogether 2,631 workers in porcelain, iron, silicate, sandstone, quartz, and coal-mining were examined, and also 500 others who were incapacitated, or in receipt of a pension, or following occupations that were presumed to be associated with silicosis. Radiological appearances were classified according to the criteria laid down by the International Silicosis Congress in Johannesburg. Silicosis developed in different occupations at apparently strikingly different rates. Thus severe silicosis developed most rapidly in quartz workers, among whom silicosis Stage 3 might be met after less than fifteen years' work, whereas among porcelain workers such a stage was not reached until after at least twenty-five years. It follows that in certain occupations silicosis might lead to incapacity while the individual was still in the prime of life, while in others this stage might not be reached until the worker was due to retire. Further, in cases in which Stage 1 silicosis took a relatively long time to become manifest the disease did not progress in the following five years; whereas in cases in which Stage 1 developed rapidly the disease might progress even if the work responsible was given up. Although the investigations led to no definite conclusions on the part played by tuberculosis in silicosis, pulmonary tuberculosis was nevertheless a complication to reckon with, even in occupations where the silicosis appeared slowly. Moreover, the outlook for persons suffering from silicosis and "open" tuberculosis is almost uniformly bad, although silicotic and tuberculous lesions might coexist without apparently exerting any influence on each other.

Discussing clinical investigations, in the second part of the monograph, Bruce concludes that, although the radiographical appearances in the various occupations are similar, nevertheless certain characteristic differences indicate the type of work causing the silicosis. By means of bronchography he demonstrated frequent bronchial changes in silicosis Stage 3, chiefly in the anterior branches. Similarly, spontaneous pneumothorax was found to complicate advanced silicosis, the pneumothorax being presumably itself a complication of the emphysema that follows fibrosis. Even when bilateral, spontaneous pneumothorax may be symptomless and disappear; but it may recur, and in general the outlook for the silicotic is worse. Bruce concludes that respiratory insufficiency in silicosis is caused by the emphysema that develops in the course of the disease; but there are certain differences between this and the "usual" emphysema.

[1] *Acta med. scand.*, 1942, Suppl. **129**.

THE HALF-YEARLY INDEXES

The usual half-yearly indexes to the *Journal* and to the *Supplement* have been printed. They will, however, not be issued with all copies of the *Journal*, but only to those readers who ask for them. Any member or subscriber who wishes to have one or both of the indexes can obtain what he wants, post free, by sending a postcard notifying his desire to the Accountant, British Medical Association House, Tavistock Square, W.C.1. Those wishing to receive the indexes regularly as published should intimate this.

THE PASTEURIZATION OF MILK*

BY

G. S. WILSON, M.D., F.R.C.P. D.P.H.

Professor of Bacteriology as applied to Hygiene, London School of Hygiene and Tropical Medicine

It is frankly impossible, in the space allowed, to put forward the full case for compulsory pasteurization of milk or to answer the numerous objections that have been raised against it. A few years ago, owing to insufficient evidence, scientific opinion was divided on pasteurization. Since then numerous experiments have been carried out in the laboratory and in the field, the results of which show that pasteurization brings about no detectable change of any significance in the nutritive value of the milk. Objections are frequently raised to it on pseudo-scientific grounds, but the real objection in the past has been financial, and has come from the producer-retailers. Before the war farmers of this kind received both the producers' and the distributors' profit; if they had been compelled to pasteurize their milk themselves, or to arrange for its pasteurization elsewhere, their receipts would have been slightly diminished. Now, however, when the Milk Marketing Board buys all their milk and sells it to them again at a uniform price, whether raw or pasteurized, this financial objection no longer has any weight.

In the following brief summary statements will have to be made without qualification, and without providing the evidence on which they are based. Those who are anxious for further information may be referred to a report which I made to the Ministry of Health and which has been published recently in book form.†

Question 1: Why is there a Milk Problem?

Answer.—Cows' milk is a food of exceptional value for the growing child. It contains a well-balanced mixture of fat, carbohydrate, and first-class protein; it is rich in mineral salts, especially calcium and phosphorus; and it contains important vitamins. On the other hand, it is more often infected with pathogenic bacteria and more likely to give rise to disease than any other common article of our dietary. Hence arises the double problem of how to improve the nutritional status of the young without spreading milk-borne disease, and how to abolish milk-borne disease without lowering nutritional standards.

Question 2: To What Extent is Raw Milk infected with Pathogenic Bacteria?

Answer.—About 5 to 10% of farms in this country are sending out milk containing tubercle bacilli; about 20 to 40% *Brucella abortus*; and a much higher proportion mastitis streptococci, which, though not usually infective to man, may cause undesirable changes in the milk. "Accredited" milk appears to be as heavily infected with tubercle bacilli as ungraded milk; and tuberculin-tested (T.T.) milk is just as heavily infected with *Br. abortus* as ungraded milk, if not more so. Bulked milk reaching our large towns usually contains all three organisms—namely, tubercle bacilli, *Br. abortus*, and mastitis streptococci. Occasionally milk becomes infected with other organisms, such as scarlet fever streptococci, diphtheria bacilli, and bacilli of the typhoid, paratyphoid, food-poisoning, and dysentery groups.

Question 3: How do Pathogenic Organisms reach the Milk?

Answer.—Tubercle bacilli, *Br. abortus*, and mastitis streptococci, from the cow's udder; organisms of the typhoid, paratyphoid, food-poisoning, and dysentery groups, either from the infected fingers of those handling the milk or from water used for washing the cows' udders, cleaning the milk utensils, or watering the milk; scarlet fever streptococci and diphtheria bacilli, from the cough-spray of the milker or from the infected udder of the cow.

Question 4: How Much Disease is Raw Milk responsible for in the Human Population?

Answer.—In England and Wales about 1,500 to 2,000 deaths a year from tuberculosis of bovine origin; 400 to 500 cases of undulant fever; occasional outbreaks of scarlet fever, septic sore throat, diphtheria, typhoid fever, paratyphoid fever, dysentery, and acute gastro-enteritis. It is known that during the years 1912 to 1937 there were at least 113 outbreaks of epidemic disease in Great Britain, affecting about 14,000 persons. During the same time about 65,000 persons in England and Wales died of tuberculosis of bovine origin, and an unascertained number, probably several thousands, suffered from undulant fever contracted through milk. If epidemic summer diarrhoea in infants under 2 years of age is included, some of the deaths during this period, which in England and Wales amounted to 190,000, must be added to this total.

Question 5: Why do Some Practitioners Belittle or Deny the Existence of Milk-borne Tuberculosis?

Answer.—Because their clinical training makes them think in terms of the individual rather than of the herd. They do not realize that if every practitioner saw a case only once in 5 years there would be 8,000 cases annually in England and Wales.

Question 6: How can Milk be Rendered Safe for Human Consumption?

Answer.—Tuberculosis and undulant fever could be avoided by the establishment of tuberculin-tested and abortion-free herds. Diseases of the typhoid, paratyphoid, food-poisoning, and dysentery groups might be diminished to some extent by a rigid clinical and bacteriological supervision of all those employed in handling milk, and by the provision to all farms and dairy establishments of a safe water supply. Since about 40% of the cattle in this country react to the tuberculin test, and about one in every 200 cows is excreting tubercle bacilli in its milk, the establishment of sufficient T.T. herds to provide liquid milk for the human population would be an enormous task. It may be pointed out that in the United States, where a campaign for the eradication of tuberculosis among cattle was started in 1917, an initial tuberculin-positive rate of 4% was reduced by 1939 to a rate of about 0.5%, at a cost of $260,000,000. In this country we should have to start with a rate ten times as high, and with herds far more closely packed together than in the States. The control of contagious abortion, which is widespread in cattle, presents an almost insuperable problem, as does that of mastitis. Control of the human personnel handling the milk is not reliable, and even if it were it would create so many administrative difficulties as to be unworkable. The only practicable method at present of ensuring that the human population is supplied with milk free from pathogenic organisms is by some form of heat treatment, of which pasteurization, if carried out under proper conditions, is undoubtedly the most satisfactory.

Question 7: What is Pasteurization?

Answer.—Pasteurization is a loose term applied to several forms of heat treatment of milk. In this country, however, only two methods of pasteurization are officially allowed—namely, pasteurization by the holder method and pasteurization by the high-temperature short-time (H.T.S.T.) method. In the holder method the milk must be retained at a temperature of not less than 145° F. and not more than 150° F. for at least 30 minutes, and then cooled to a temperature of not higher than 55° F. The milk must *not* be heated more than once. The processing plant must be provided with indicating and recording thermometers, and temperature records must be preserved for a period of not less than 1 month. In the H.T.S.T. method the milk must be retained at a temperature of not less than 162° F. for at least 15 seconds, in an apparatus that is thermostatically controlled and provided with an automatic device to divert the flow of any milk which has not been so treated. The milk must then be cooled as under the holder process. The efficiency of either method may be tested by means of the phosphatase reaction. The enzyme phosphatase is destroyed by a time-temperature combination slightly higher than that necessary to destroy tubercle bacilli. Milk, therefore, in which the phosphatase test is negative can be regarded for all practical purposes as free from pathogenic organisms.

Question 8: What Effect has Pasteurization on the Properties and Nutritive Value of Milk?

Answer.—About 5% of the lactalbumin is coagulated; the coagulation time by rennin is lengthened, but the casein clot formed consists of finer particles and is of a more open texture; there is a diminution of about 5% in the soluble calcium and phosphorus; there may be some loss of iodine through volatilization; about 10% of vitamin B_1 is destroyed, and about 20% of vitamin C; the flavour of the milk is somewhat altered owing to the removal of volatile products from the raw milk, but in properly pasteurized milk the acquirement of a cooked flavour is practically negligible and cannot be distinguished except by a very few persons; the keeping quality of the milk is increased considerably. Against these positive changes may be set a number of negative findings. Observations on rats, mice, calves, and children have failed to reveal any change in the biological value and digestibility of the protein, in the availability of the calcium and phosphorus, in the amount of vitamin

* This article is contributed by special request.—ED., *B.M.J.*

† *The Pasteurization of Milk*, by G. S. Wilson. Edward Arnold and Co., London. 1942.

A or D, or in the total energy or nutritive value of the milk for the growing animal.

Question 9: Does Pasteurization Destroy Pathogenic Organisms in the Milk?

Answer.—The tubercle bacillus is destroyed by a temperature of 138° F. in 30 minutes, of 145° F. in 5 to 10 minutes, of 150° F. in 2 to 5 minutes, and of 160° F. in 12 seconds. It will be seen that there is an ample margin of safety in the time–temperature combination laid down for the holder method, and a fair margin of safety in that laid down for the H.T.S.T. method of pasteurization. Other pathogenic organisms—with the exception of *Staphylococcus aureus*, which is not pathogenic by the mouth—are more susceptible to heat than the tubercle bacillus, so that their survival in pasteurized milk is improbable.

Question 10: Is Pasteurization Antagonistic to Clean-Milk Production?

Answer.—It is not sufficiently appreciated that the quality of the pasteurized product depends to a considerable extent on the cleanliness of the raw milk. It is therefore to the advantage of the large dairy companies practising pasteurization to obtain the highest quality of raw milk. To most farmers it is immaterial whether their milk is pasteurized or not. Their real motive for improving the cleanliness of their supply is financial. The operation of the accredited-milk scheme in this country showed that a bonus payment of 1d. a gallon for accredited milk led to an enormous increase in the number of registered suppliers, in spite of the fact that a large part of the milk so produced was being taken to London and the large towns to be pasteurized. It is sometimes objected that a farmer who has taken considerable trouble to produce clean milk will be disheartened if he finds that his milk is to be mixed with that of a lower standard of cleanliness from other farmers. Perhaps this is true, but it is an argument not against pasteurization but against the bulking of milk.

Question 11: Is Pasteurization Antagonistic to the Eradication of Diseased Animals from Milking Herds?

Answer.—As with clean-milk production, the stimulus to eradicate disease is almost purely financial, and is unaffected by the subsequent history of the milk. This has been amply shown by the success of the Tuberculosis (Attested Herds) Scheme, in which financial support was given to the producer who was anxious to eradicate tuberculosis from his herd. It is also borne out by the experience of the United States. In 1936, for example, no less than 99.8% of raw milk and 99.2% of pasteurized milk distributed in towns of 1,000 inhabitants and over was derived from T.T. herds. The two figures are so nearly identical as to lend no colour to the view that pasteurization retards the process of disease eradication.

Question 12: How Often is Pasteurization Inefficient?

Answer.—The term "pasteurized" is often applied erroneously to any heat-treated milk, not solely to milk that has been heat-treated in a licensed plant by one or other of the two methods laid down by the Ministry of Health. Many of the statements that pasteurized milk has been found to contain tubercle bacilli are incorrect if the word "pasteurized" is limited, as it should be, to officially pasteurized milk. Stringent requirements are exacted under the Milk (Special Designations) Orders of 1936 and 1938. In addition we have now a reliable test—the phosphatase test—for determining whether or not the milk has been adequately heat-treated. The proportion of inefficiently pasteurized milk is therefore much less than ten years ago. Examination of 1,439 samples of pasteurized milk taken during 1934 to 1936 in London, Manchester, Sheffield, and Liverpool failed to reveal living tubercle bacilli in a single sample, in spite of the fact that the raw supply was often infected. It is not denied that the record of small dairies may be less satisfactory than that of the larger dairies supplying our great cities, but if compulsory pasteurization was introduced more thorough supervision would be exercised over these smaller plants. Admittedly, owing to some undetected fault in the plant or to some human error, the milk may at times be inefficiently heated; but there is no more reason to condemn pasteurization on this account than there is to condemn railway transport because of the occasional failure of the signal system.

Question 13: Does the Consumption of Raw Infected Milk in Childhood Protect against Pulmonary Tuberculosis in Adult Life?

Answer.—Though some doctors believe this to be true, there is no reliable evidence in its support. Those who do advocate the consumption of raw infected milk fail to realize that what they are recommending is a method of indiscriminate vaccination with living tubercle bacilli in the hope that, by a process of natural selection, the survivors will be more resistant in later life to invasion by the human tubercle bacillus. Against what other disease, it may be asked, would a method of vaccination be tolerated that is known to demand at present the sacrifice of 1,500 to 2,000 lives a year?

Conclusion

Cleanliness of production is no safeguard against tuberculosis or contagious abortion in the cows; and T.T. milk is just as exposed as ungraded milk to infection from human sources. Though the ultimate ideal may be clean milk produced from disease-free herds and protected from human contamination, there is no other immediate practical solution to the problem of supplying safe milk to the public but pasteurization. Whether we like it or not, the logic of the case is inexorable.

EXPERIENCES IN A MILITARY HOSPITAL IN FREE CHINA

BY

H. T. LAYCOCK, M.B., F.R.C.S.

Surgeon, Friends' Ambulance Unit in China

In February and March, 1942, I had the strange experience of doing surgery in a military hospital in Kiangsi Province, in S.E. China. To reach this area it was necessary to make an overland journey of about 2,500 miles from Rangoon.

K. is a large Chinese city, the foreign residents of which are practically limited to two small mission communities. Several widely differing dialects are spoken, so there are formidable obstacles for the linguistic amateur. The nearest battle front is several hundred miles away in N. Kiangsi. The hospital in which I lived had 100 beds, a primitive operating theatre and laboratory, but no *x*-ray department. There were a few civilian victims of a recent air raid, and the other cases were all of wounded soldiers. There was no one practising surgery when I arrived, nor was there at the military hospital of 600 beds outside the city. I was received with great cordiality by the medical staff and by the local military commander, and was invited to help myself freely to surgical material from both institutions. I was further assured that when I had finished with these there were 4 more military "hospitals" waiting for me at greater distances. I use inverted commas advisedly because it requires some imagination to describe as hospitals some of the dumping-grounds in which many Chinese wounded soldiers develop their chronic lesions.

Medical and Nursing Staff

Our hospital was relatively good. It had been built up by the New Life Medical Movement, founded at considerable sacrifice by a group of doctors who gave up lucrative practices in the occupied areas in order to help Free China. The staff consisted of 3 doctors, of whom 2 had good qualifications and a knowledge of English. The third, alas! had neither. China has some excellent medical schools, but in others the qualifying standard is a low one, perhaps comparable to that required of a sub-assistant surgeon in India. A difference is that in China the holder is not debarred, if he can pull the necessary strings, from holding the most senior posts in hospitals. There were 7 nurses, of whom 2 were well trained, while the rest tried to make up for their amateur status by their infectious enthusiasm. There was unfortunately no system of night nurses, and from 8 p.m. until 8 a.m. the patients were at the mercy of a number of nondescript "boys," who were as likely to consign to perdition anyone who complained as to fetch help. On one occasion one of these "boys" showed a deplorable complacency in the presence of secondary haemorrhage.

Types of Wounds

The military patients came from various battle areas, especially from that around Changsha. All were more or less chronically disabled, and the majority had unhealed wounds of from 6 months to 4 years' duration. These cases of unhealed wounds fell into 3 classes. In the largest (45%) there was a sinus, or sinuses, connected with chronic osteomyelitis and/or a foreign body. I had no *x*-ray apparatus to guide me, but found in nearly every case that exploration was justified by the results. A typical case was that of a soldier, aged 24, wounded 3 years before. He said he had had 9 operations, presumably curettings, during this time. He had a completely stiff ankle associated with 3 sinuses. I explored a cavity in his tarsus and

removed a large piece of shrapnel, which gave him great satisfaction. In spite of considerable opposition I introduced closed-plaster therapy in K. It was very difficult to convince the Chinese staff and patients that an offensive odour was no cause for alarm.

The other big group of patients with unhealed wounds (40%) had leg ulcers initiated by trauma and apparently maintained by syphilis, malnutrition, and lack of rest. Some of these were the largest I had ever seen; some extended the whole length of the tibia; others completely encircled the leg, often deeply involving the calf muscles. Many were associated with a fixed equinus. We had no potassium iodide and no organic arsenical preparations (in Kiangsi N.A.B. cost 120 dollars—about £1 10s.—per ampoule!). Rejecting as hopeless the very large ulcers just mentioned, I tackled the smaller ones by excision of the edges and curetting the unhealthy granulations of the base. For this the Chinese do not seem to feel the need for anaesthesia. A week or so later the areas so prepared were treated with pinch grafts. The results were uniformly good, which was surprising, especially as there was little discipline in the place and it was difficult to persuade the patients to stay in bed.

The remaining cases (15%) had not healed for a variety of reasons. For example, there was a bronchial fistula, a small bowel fistula, a subphrenic abscess following an untreated bullet wound of the abdomen which was discharging on the surface though drainage was inadequate, a bullet wound of the perineum with multiple urinary fistulae, a sinus connected with an infected extradural haematoma, and so on.

"Chronic" Disablement

Some of these young soldiers were pathetically eager for treatment, but many were quite content to remain chronically disabled. On most Chinese battlefields medical services are conspicuously absent, and it is left to the wounded man to extricate himself if he can. If he is seriously wounded he does not get away. With a less serious injury he does not get treatment in the early stages, and the journey to hospital takes so long that his disability is likely to have passed into a chronic state before he does arrive. Even in hospital he is most unlikely to receive radical treatment. In the large base hospital outside K. there were 600 patients. No notes were kept and practically no surgery was done. The general standard of the place is illustrated by the fact that many of the patients chose to walk 5 miles into the city each day in order to have their dressings done either at our hospital or at one of the mission stations. Perhaps the chief reason why most of the patients showed no eagerness to get well was that "occupational therapy" was available. This meant that the men were allowed to make string and to be paid for doing so. By getting up at 5.0 a.m. and working hard all day, as many of them did, a man could earn as much in one day as he would earn in a week at the front. Additional attractions were regular, if inadequate, meals while in hospital and access to the local cinema, so that the complacency with which they came to regard themselves as incurable was easy to understand. One man, aged 28, gave an indefinite history of a wound in the leg healed months before. For nearly a year he had walked about the city with one knee full-flexed, using crutches. When I gave him a spinal anaesthetic and demonstrated to his companions that both his legs were normal he was much upset and they were vastly amused.

STERILIZATION OF SULPHANILAMIDE POWDER

The Medical Research Council recently called a conference, which was attended by clinicians, bacteriologists, and representatives of the Association of British Chemical Manufacturers, to consider methods of sterilization of sulphanilamide powder for local application. The following is a summary of the findings of the conference.

The report[1] of a fatal case of tetanus which was possibly due to infection from the container of a sulphonamide powder applied locally emphasizes the desirability of the practice, already adopted in the United States, by which all sulphonamide preparations intended for topical application are marketed ready sterilized in sterile containers. It has been shown that if sulphanilamide powder contaminated with tetanus spores is implanted in the tissues of animals, the presence of the drug does not prevent the development of tetanus.[2] An account by Dr. John H. Brewer of the procedure used by Hynson, Westcott, and Dunning in America for the large-scale sterilization of sulphanilamide powder in 5-g. packages ready for use was published with a covering letter from Lieut.-Col. Perrin H. Long in the *Lancet*, Sept. 12, 1942 (p. 322). At a conference held in Nov., 1942, between representatives of the Medical Research Council and the Association of British Chemical Manufacturers it was agreed that the Hynson, Westcott, and Dunning procedure was suitable for adoption also by British manufacturers of sulphanilamide powder, and that the powder thus sterilized should be issued in sterile packets each containing 5 g.

Since, however, this recommendation must inevitably take some time to put into full effect, and it would not, in any event, apply to existing stocks of the powder held in hospitals and at aid posts, the conference proceeded also to consider suitable methods for the small-scale sterilization of sulphanilamide powder. It was considered probable that lack of uniformity in the results reported by different investigators with a particular sterilizing method which, on theoretical grounds, should have proved satisfactory was attributable to minor variations in technique, and, more especially, to the known variability of different commercial preparations of sulphanilamide powder with regard to chemical purity and physical properties. Thus, it was pointed out that thermostatic control of a hot-air oven, without a check on the actual temperature of the powder itself, was insufficient to ensure that the temperature aimed at for sterilization was in fact being applied: careful control in this respect, by means of thermocouples in certain of the packages, was one of the notable features of the procedure used by Hynson, Westcott, and Dunning for large-scale sterilization. Caking and discoloration of the powder on heating might depend upon a number of factors, including the degree of purity, the moisture content, and the particle size. Very fine powders tended to cake, and the powder found satisfactory for large-scale issue in the United States was standardized at a 40-80 mesh. It was agreed that a sulphanilamide powder to be satisfactory for local use after sterilization should not show more than a slight discoloration after heating at 150° C. for one hour.

Small-scale Processes for Hospitals

For the small-scale sterilization of sulphanilamide powder in hospitals, etc., the following alternative procedures were recommended:

(A) Dry heat maintained at 150° C. for one hour in a paraffin bath, with the technique proposed by H. Berry[3] as follows: "Use dry sterile cotton-wool-plugged test-tubes (5 inches × 3/4 inch or smaller diameter). Half fill them with the dry powdered substance, using a powder funnel. Flame the upper portion of the tubes and replug with the sterile plugs. Immerse to within one inch of the tops of the tubes in a liquid paraffin oil bath and maintain at 150° C. for one hour. If the tubes are to be stored the plugs should be covered with cellophane or paper."

(B) Dry heat maintained at 150° C. for one hour in an electric oven, with precautions to ensure even heating throughout.

(C) Autoclaving in a dressings sterilizer by the technique and with the precautions proposed by W. J. Buckland[4] as follows: "An autoclave with vacuum drying attachment (dressing sterilizer) is used and the container is a dry boiling-tube plugged with non-absorbent wool. The boiling-tube must be thoroughly dried, if possible in a hot-air oven. (1) The jacket pressure of the sterilizer should be ready at a pressure of 20 to 30 lb. (2) Allow steam at 20 lb. into the empty closed chamber of the autoclave and leave for five minutes. (3) Using the appropriate valves clear chamber of all steam and condensed water. This process has heated the chamber, and the boiling-tubes, loosely plugged with non-absorbent wool and containing the powder (in 5- or 10-g. batches), are now placed in it. They should be placed on their sides, with the powder spread over their full length, giving a thinner mass for the steam to penetrate. (4) Leave the tubes for 15 minutes in the hot chamber; this heats tubes and contents sufficiently to prevent condensation inside and on the powder. (5) Autoclave at 15 lb. for half an hour. (6) Clear the chamber of steam and any condensed water quickly, and allow vacuum of 10 to 15 inches for 15 minutes. (7) Remove tubes from autoclave, place a tight sterile plug of non-absorbent wool on the top of the one already in, and cap tubes with a suitable paper—preferably cellophane. Caking does not occur. If apparent caking is observed, it is only present while the powder is still hot, and when cool a tap on the side of the tube is all that is necessary to show the sterile preparation to be the desired soft powder."

A proviso should be added with each of these recommendations that a sulphanilamide powder to be satisfactory for local application should not cake or be more than slightly discoloured with any of the techniques proposed.

The recommendations of the conference related only to sulphanilamide powder, as the sulphonamide preparation most frequently applied locally. It may be mentioned, however, that the paraffin bath technique described by Berry[3] is recommended by the author as being suitable also for the sterilization of sulphathiazole powder in hospital practice.

[1] *Pharm. J.*, May 30, 1942, p. 192; *Lancet*, 1942, 1, 770.
[2] Welch, Slocum, and Herwick, *J. Amer. med. Ass.*, 1942, **120**, 361.
[3] *Pharm. J.*, Oct. 24, 1942, p. 139.
[4] *British Medical Journal*, 1942, 2, 264.

SALARIES AND EMOLUMENTS OF NURSES

FIRST REPORT OF RUSHCLIFFE COMMITTEE

In November, 1941, the Minister of Health appointed a Nurses' Salaries Committee, under the chairmanship of Lord Rushcliffe, to draw up agreed scales of salaries and emoluments for State-registered nurses employed in hospitals in England and Wales. The committee's first report, which has now been issued as a Command Paper,[1] deals with female nurses other than those employed in mental hospitals. Further reports affecting nurses in the public health service, district nurses, and male nurses will be issued later, and a separate committee, also under the chairmanship of Lord Rushcliffe, is considering midwives' salaries.

The work of the committee has been done by two panels, one nominated by organizations representing nurses and the other by organizations representing employers of nurses. In approaching their problems the committee has been guided not only by consideration of what is a fair and appropriate remuneration for a nurse, having regard to her status and responsibilities, but also by the importance of attracting the right type of person to the profession. Further, the number of trained nurses qualifying at the present time is not enough to satisfy growing demands or to make good the wastage caused by nurses giving up their work for personal reasons such as marriage. "Notwithstanding the many demands on woman-power at the present time," the report states, "an increased flow of suitable student nurses into hospitals should be encouraged. . . . What is required as a stimulus to recruitment is that the prospect of the nurse after training, in senior as well as junior posts, should be equitable and attractive."

Present Proposals

The chief recommendation is, therefore, that there should be national salary scales covering every grade of nursing staff in every type of hospital (except mental hospitals). The report sets out what these graded salaries should be, and at the same time fixes for each category of nurse what is regarded as a reasonable valuation of the emoluments (board, residence, and laundry), in terms of cash, this amount to be the standardized value for superannuation purposes. The salaries for matrons and assistant matrons are to vary according to the type and size of the hospital. The matron's salary in a hospital of 500 or more beds approved by the General Nursing Council for complete training in general nursing, sick children's nursing, or fever nursing will range from £450 to £700 (total value of salary and emoluments £650 to £900). For nurses from student status to that of qualified senior sister tutor the new salaries will be as follows:

	Scales of Annual Salary	Total Value of Salary and Emoluments
Student nurse	First year, £40; second, £45; third, £50; fourth year (before State registration), £60; fourth, after State registration (if on four years' contract), £70	£115–£145
Staff nurse (on general part of State register)	£100, rising by £5 a year to £140	£190–£230
Ward sister	£130, rising by £10 a year to £180; with one additional increment of £20 after ten years' service as ward sister	£230–£300
Qualified senior sister tutor (in charge of one or more others)	£260, rising by £15 a year to £350	£380–£470

Slightly higher rates of pay are proposed for nursing staff up to and including sisters in sanatoria and tuberculosis hospitals, because "of the special difficulty in staffing that prevails."

Other Recommendations

The report makes some recommendations to the General Nursing Council on the training of sister tutors. It suggests that the council should standardize the training, as the Central Midwives Board has that for midwives—that is, it should draw up a curriculum, prescribe rules of admission including the amount of experience that candidates should have had, and approve institutions for training purposes. It is further recommended that an educational grant should be made by the Ministry of Health to enable suitable nurses who otherwise could not afford it to train as sister tutors. Sanatoria should be encouraged to become training schools for those taking up the nursing of cases of tuberculosis and certain respiratory diseases, and it is suggested that there should be a supplementary part of the State register for such nurses, though the use of the term "tuberculosis" in the title should be avoided.

The new salaries, which are to come into operation on April 1, are based on the general establishment, as soon as conditions permit, of a 96-hour fortnight, day or night. In the committee's opinion all nurses, including students, should have at least one complete day off duty a week and should have 28 days' holiday with pay each leave year. It is not desirable that there should be nursing staff doing permanent night duty; the maximum continuous periods of night duty should be six months for sisters and staff nurses and three months for student nurses. All nurses should be provided with uniform free of cost, and the practice at some hospitals of charging a fee from students at the beginning of their training should be stopped. Finally the report makes recommendations about sick pay, and also suggests that all nursing staff at sanatoria and tuberculosis hospitals, other than matrons or assistant matrons, should have free travel twice a week to the nearest centre of population.

The Minister of Health, announcing the publication of the report in the House of Commons on Feb. 11, stated it was estimated that the total additional cost of these recommendations would be between £1,500,000 and £2,000,000 a year, and he was informing local and voluntary hospital authorities that the Government was prepared to pay 50% of any increased expenditure incurred in giving effect to these recommendations.

THE POSITION IN SCOTLAND

The corresponding committee in Scotland, under the chairmanship of Prof. T. M. Taylor, has also recommended national salary scales, the salaries suggested for student nurses and for ward sisters being the same as for similar personnel in England and Wales, except that sisters reach their maximum in 15 years. In the case of staff nurses in Scotland the maximum salary is to be lower but the increments larger—i.e., £100 a year rising by £10 to £120; and a qualified senior sister tutor in charge of two or more others will receive £250 with annual increments of £10, but her maximum has not yet been agreed. As in England and Wales the salaries of all matrons and assistant matrons will vary with the size and type of hospital—for example, the assistant matron of a hospital of over 300 but under 500 beds will receive a salary of £240 rising by £15 a year to £285 (emoluments £120); the starting salary of a matron of a similar hospital will be £350, with annual increments of £125, but here again the maximum has not yet been decided.

The two reports agree on such questions as the 96-hour fortnight, night duty, free uniform, and the abolition of entrance fees for students. Sick pay, annual leave, and off-duty time are still being considered. The Scottish report, however, goes further than the English one and makes recommendations about the salaries of midwives, health visitors, and district nurses. Subject to certain adjustments for qualifications and duties undertaken, the salaries of domiciliary midwives, health visitors, and district nurses will normally start at £250 a year and rise to £320 in the 15th year. Where board and residence are provided the salary will be £100 less.

Local and hospital authorities in Scotland have received the same assurance as those in England and Wales that the Government will pay 50% of any increased expenditure these improved salary scales will mean.

[1] Cmd. 6424. H.M.S.O., York House, Kingsway, W.C.2. (9d., post free 11d.)

THE ROYAL COLLEGE OF SURGEONS

The Scientific Report of the Royal College of Surgeons of England for the year 1941–2 records the first steps in the restoration of the College Museum. Gifts from individuals and institutions, and offers of assistance from all over the English-speaking world, are laying the foundations of the new collections. Although relics of Hunter and Cheselden, Paget and Shattock have been lost for ever, these new collections in their own way will be equally historic. Specimens from Melbourne, Sydney, and Wellington will share the same shelves as those from Edinburgh and Manchester, Colombo and Capetown, Chicago and Montreal. They will be symbols of united purpose in a common cause and tributes to the common tradition of Hunter and Lister.

During the year the Research Laboratories have continued to make fundamental contributions to our knowledge of the effects of haemorrhage and transfusions. Articles on these researches appeared in this *Journal* during 1942. It is unfortunate that the demands of the Services prevent fuller use being made of the research facilities at the College. There is no lack of problems of immediate practical value, but Service men and women well trained and interested in research problems often lack the facilities to carry on their investigations. Perhaps some means can be found of seconding them for limited periods to laboratories which have the facilities they require.

A SAFE MILK SUPPLY

B.M.A. Deputation to the Minister of Food

On May 18 the British Medical Association led a large and influential deputation to the Minister of Food (Rt. Hon. Lord Woolton) to urge the need for complete and efficient pasteurization of milk. The deputation included representatives of the Royal Colleges, the National Association for the Prevention of Tuberculosis, the Joint Tuberculosis Council, the British Paediatric Association, the People's League of Health, and other bodies. With the Minister was Miss Florence Horsbrugh, M.P., Parliamentary Secretary to the Ministry of Health.

Prof. R. M. F. PICKEN, Acting Chairman of the Council of the B.M.A., introduced the deputation by pointing out that there was no serious difference of opinion in the medical profession on the question of pasteurization; few questions in preventive medicine commanded so nearly complete unanimity. The Representative Body in 1936 agreed, with only one dissentient, "That only milk complying with the conditions required for the designation 'tuberculin tested' or 'pasteurized,' or preferably both, can safely be consumed without boiling." When the British Medical Association decided to embark on a campaign of medical publicity the first thing it did was to spend some thousands of pounds on advertising safe milk. In February, 1939, the Association led a deputation on the subject to the Ministers of Health and Agriculture. The Royal College of Physicians had recently passed a resolution advocating pasteurization. Seven years ago, when the British Medical Association gave qualified approval to "tuberculin tested" milk in the raw state, it did so in the hope that steps would be taken to improve the quality of milk in that respect, but in 1939 he believed that only 3% of the herds in this country were attested, and there had been no increase since then. There was no quick solution on those lines, and pasteurization was the only practicable safeguard which had no serious disadvantage. The problem had been intensified in wartime by the proper endeavour of the Ministry of Food to maintain milk production and to increase consumption among young children. The necessary redistribution of milk rounds took away from families the free choice of dairy, so that many who had been accustomed to buy safe milk had been transferred to dairies which could not supply it.

Prof. L. P. GARROD (St. Bartholomew's) said that tuberculosis was deplorably common among dairy cattle, and the percentage of samples of milk which contained some tubercle bacilli was between 5 and 10. One-third of the deaths from tuberculosis in children under 5 were due to the bovine organism; this meant 2,000 deaths a year, with, of course, a much larger incidence of invalidism and crippling. Another disease of the cow which was transmitted in milk was contagious abortion, producing in man a long and incapacitating fever; this was not very common, but some hundreds of cases occurred. Ordinary infectious diseases might also be conveyed by milk, commonly owing to contamination by the milker. He instanced the typhoid fever epidemic at Bournemouth in 1936. The only remedy was pasteurization. All bacteria concerned in producing these diseases were destroyed by a moderate degree of heat, far below boiling-point, applied for a short time. Pasteurization did not alter flavour. Admittedly it destroyed a certain amount of vitamin C, which could be made up in the form of fruit juice. The advocacy of pasteurization had been referred to as a policy of defeatism—the countenancing of the production of dirty, infected milk, and covering its defects by this additional process. That was a specious argument. There was no immediate prospect of eradicating tuberculosis from cattle—that would take a generation—and to guarantee that no person handling milk was a carrier of germs of disease would mean an impossibly rigid supervision of the whole personnel of the industry. Pasteurization must be recognized as the only complete safeguard, but it must be pasteurization carried out efficiently in accordance with standard regulations.

Dr. ALAN MONCRIEFF said that paediatricians were anxious about the possibility of infections of the alimentary tract which were traceable to dangerous milk. The adjective which should be stressed was "safe." Innumerable claims had been made for various grades of milk, but the grading system had dismally failed from a safety point of view. The term "T.T. milk" was most unfortunate. Even if tuberculosis were eradicated by getting rid of all infected cattle, the danger of other infections would remain. Only a special pasteurization process which could be easily controlled by tests seemed to give the guarantee of safety required. The question had been raised as to whether some immunity was lost by not drinking raw milk. There was no scientific evidence that raw milk conferred any sort of immunity. Even if it did, the price would be too high to pay. If inoculation against diphtheria involved 2,000 deaths a year—which was what bovine tuberculosis in young children involved—it would be difficult to maintain propaganda for inoculation.

Dr. D. S. SUTHERLAND said that during the last ten years between 1,200 and 1,800 samples of milk entering Manchester had been examined annually. The percentage of samples in which tubercle bacilli were found varied from 10.57 in 1933 to 7.12 in 1941. In the case of samples of pasteurized milk it was only during the last two years that any tubercle bacilli had been found at all, and then only to the extent of 1.11% and 0.45% of the samples, whereas the figures for samples of milk coming from tuberculin-tested herds had varied from 8.7% to 2.27%. The appearance of bacilli in pasteurized milk during the last two years was no reflection on pasteurization, but only on the way in which it was carried out during the war, with the withdrawal of skilled workers.

Prof. W. H. TYTLER, who represented the National Association for the Prevention of Tuberculosis, said that its council had unanimously recommended the extensive application of pasteurization. There still seemed to be an impression that the role of milk in causing tuberculosis in human beings was controversial, but in fact it was as well established as the case against the mosquito as the carrier of malaria. He also mentioned an investigation into the outbreak of meningitis in 1941 with a view to ascertaining whether there was an increase in the proportion of bovine infection, and whether this was traceable to milk or was due to the movements of evacuated children affecting a particular locality. The results were rather indefinite, but there was some suggestion that there was a relative as well as an absolute increase in the amount of bovine infection causing meningitis, and that milk was responsible for at least a part of the meningitic wave.

Sir ALFRED WEBB-JOHNSON said that he had thought it his duty as President of the Royal College of Surgeons to join the deputation because of the enormous importance of the prevention of surgical tuberculosis. A moral, if not a legal, responsibility attached to the Government as controllers of the organization and sale of milk to take adequate steps to prevent infection. Prof. HARRY PLATT (Manchester), Dr. J. A. STRUTHERS (M.O.H., Holborn), and Dr. HARLEY WILLIAMS also spoke in support of the objects of the deputation.

Dr. C. O. HAWTHORNE, speaking for the People's League of Health, said that the public was attracted and misled by the use of such terms as "clean" or "pure" milk; and even "accredited milk," which had received a certain amount of official countenance, did not escape reproach. The term he preferred was "safe milk," meaning pasteurized milk, which was the only label guaranteeing against infection. One factor to be borne in mind was the number of children who had been evacuated from towns, where they had mostly received pasteurized milk, to country districts where milk was not pasteurized. In these circumstances boiling ought to be emphasized as a means to the same end.

Lord Woolton's Reply

Lord WOOLTON expressed his gratitude to the deputation. He could not imagine a more influential one. He recognized fully the obligation of the Government to obtain a milk supply which could do no harm, or alternatively, if this was not possible, to issue instructions as to how people should obtain reasonable security in the process of drinking milk or giving it to their children. Miss Horsbrugh and he would report this conversation to their colleagues in the Government. He found it difficult to resist the weight of scientific and professional evidence which had been assembled. What the Government had the power to do was obvious, but it was of no use introducing legislation which was not effective. He was at present engaged in collecting all the necessary information regarding the available machinery and competent labour to undertake the work which would give to the public security on this question.

Correspondence

The B.M.A. and the Beveridge Report

SIR,—The B.M.A. is to be congratulated on its ready acceptance of Assumption B of the Beveridge report provided legislation on the lines of the whole report is carried through. However, if there are to be "comprehensive health and rehabilitation services for prevention and cure of disease and restoration for capacity for work available for all members of the community" at a standard rate, what inducement will there be for anyone to pay more than that rate for any part of the service? Or, looking at it the other way, if "the whole resources of modern medicine" are at the "disposal of every man, woman, and child in the country," what else will the medical profession have to offer anyone at any price?

The present National Health Insurance service is not comprehensive, and is not available to a large section of the community. Thus, theoretically at any rate, persons outside that service now pay for their own private treatment because that is the only way they can obtain medical benefits of any sort. But if the National Health Insurance service were open to everyone, and, in addition, were declared to provide "the whole resources of modern medicine," what inducement could there be for anyone to pay any more than was necessary to obtain such a service? On that very vital question hangs proviso (*b*) of the motion now under consideration by the B.M.A.

If the medical profession offers every citizen full medical services under the 100% proposal and at the same time announces that it is prepared to accept a higher rate of payment by private arrangement for the same services, the public must conclude either that we think it worth while to exploit the type of person who will pay £2 for what he can get for £1 or else that we are conniving at the suggestion that patients treated under the 100% proposal are not really "enjoying the whole resources of modern medicine" at all. There are no other alternatives, and either of these conclusions is equally disturbing to that sense of security and confidence that the whole Beveridge plan is designed to create.

The recipient of State service, particularly at times of severe illness, would wonder if a few shillings might induce the doctor to exert himself a little more, and the man who paid private fees would feel that he had the right to expect that "little more" in any case. You cannot offer a service or commodity at two different prices without suggesting that there are two different qualities available. The whole idea seems to embody all the evils of the tipping system and smack of a blatant commercialism which would lower the status of the medical profession for evermore. Even without admission of private practice doctors would still be free to accept tokens of gratitude. That in itself provides quite sufficient latitude for abuse without giving any open hint to the public that we have a "back room" and a "special welcome" for our more wealthy patrons.

Let the medical profession offer to "every man, woman, and child the whole resources of modern medicine" and see to it that every one in that profession is adequately paid for his services. Then set up no rival standards, but, by every possible means, induce every member of the community to believe that the best is always at his disposal, and that those who give it are satisfied that the community is paying them a fee worthy of their best efforts. Any Government could be relied upon to appreciate that to establish such confidence it was of prime importance that the just claims of the profession should be fully satisfied. See to it that this nation's medical services are so good that no patient or doctor feels that better can be obtained anywhere "for love or money." Let the public know that this, at least, is our endeavour from the outset, and that we are making no provision for nor are we permitting any other standard of service to be available to anyone.—I am, etc.,

Eye, Suffolk. J. SHACKLETON BAILEY.

SIR,—"The doctor must be the servant of his patient," you state in your leading article (Feb. 13, p. 193). Is this incompatible with his being the servant of the State? Your antithesis is surely false. The doctor, even if he were the servant of the State, would still in his own professional domain be his own master. He does not want to be the servant of his patient. He suffers from that too much already, and many patients think that they have only to whistle to make the doctor jump; and what is more, they have the power to do so, thanks to the isolationist and competitive atmosphere in which we work. So bad is this in some parts of the country in which I have practised that patients deliberately play off one doctor against another to obtain a reduction of fees.

It is time that the doctor was, professionally, captain of his own soul, and this he has the chance of being under a State Medical Service. No longer need his hand be forced by the ignorant, the capricious, and the dominating among his patients. In a wealthy town on the South Coast no fewer than 187 priority milk forms were received in one milk shop on the first morning of the priority scheme. One can draw one's own conclusions from that fact; they may be right or wrong.

As a profession we seem to get the worst of every bargain, and the portents would seem to indicate that we risk running true to form once again.—I am, etc.,

Hove. G. LLEWELLYN DAVIES.

SIR,—The decision arrived at by the Special Representative Meeting and the Panel Conference summoned for March 31 will be momentous to the prestige of the medical profession and to the course of future negotiations. The resolutions on which these meetings will be called upon to vote are set out in the *Supplement* of Feb. 13 (p. 25), and we hope that every Division and Panel Committee will give serious consideration to the second proviso (*b*) which is recommended as a condition of co-operation. It runs as follows: "(*b*) That those members of the community who decide not to avail themselves in part or in whole of the benefits of the service open to them should not be precluded from obtaining the medical services they desire from doctors within the scheme, paying for such service privately, with the necessary safeguards to prevent abuse."

It may well be that the retention of some measure of private practice will be found desirable in the interests of the new medical service, and it will be the duty of the medical representatives conducting negotiations with the Government to watch the interests of the profession in this respect. But if we, as a profession, offer co-operation in the establishment of a comprehensive service we must surely put the efficiency of that service before all other considerations. To make our co-operation conditional on the retention of private practice, as proposed in proviso *b*, will lay us open to the charge by both the Government and the public that we are concerned primarily with the security of our own vested interests. The details of this new service have still to be worked out. To prejudice negotiations at this stage by the introduction of any conditions is surely undesirable if co-operation is to be obtained between all parties.

We hope, therefore, that both the Representative Meeting and the Panel Conference will vote unanimously for the deletion of proviso *b*.—I am, etc.,

J. W. E. CORY,
Hon. Secretary, West Suffolk Division "Study Group."

Bury St. Edmunds.

SIR,—I protest strongly against the statement in your leading article (Feb. 13, p. 193) that the doctor must be the servant of his patient. This is a dangerous and invidious statement, especially as it has already been copied in the lay press. A doctor is the servant of his profession, and no man can serve two masters. Further, we are not all of the servant class.

No section of the community has more scope than ours for the exploitation of hypocrisy and dishonesty. And the fact that these have been so little exploited is one of the chief reasons why we have maintained our privileges and a certain respect throughout the ages. If, however, it is publicly decreed that we must accept the role of servant to our patients then servility must follow, while hypocrisy and dishonesty will soon be established as merely professional characteristics and perquisites.—I am, etc.,

New Buckenham, Norfolk. R. G. BLAIR.

A Member Resigns

SIR,—Your leading article (Jan. 30, p. 155) is unusual, alike in its choice of subject and in its treatment of that subject. The curious mixture of the self-assertive, the faintly deceptive, the slightly minatory, and the suddenly plaintive suggests a comparison—from which all right-minded B.M.A. members will instantly recoil—with the curious present-day gyrations of a certain totalitarian propaganda machine.

With your contention that many B.M.A. members are lukewarm in their support of the Association I am not at the moment concerned, true though it is in fact. It cannot, however, be doubted that Service members have had little or no voice in the planning of the future of our profession and, in the nature of things, this cannot, at the moment, be otherwise. The Secretary's account of his successful negotiations with the Director-General of the Army Medical Services, resulting in permission being granted to R.A.M.C. officers to record and transmit their views on medical planning, touches only the fringe of the subject. Such permission can be of value only to the R.A.M.C. officer serving in this country, and, in fact, its value is theoretical rather than practical. The R.A.M.C. officer, be he administrator, specialist, or humble general duty officer, is, contrary to popular belief, already fully occupied with the very necessary task of helping to win the war. So far as our armies over-seas are concerned, one hesitates to ponder the replies from colleagues in the jungles of Burma, the sands of Libya, or the mud of Tunisia to an inquiry on their views of the future of our profession. Such replies, we hazard, would be bright and brief, if not particularly brotherly. Incidentally, we are not told whether similar freedom to express their views has been accorded to our colleagues in the Royal Navy and the Royal Air Force.

Doubtless our naval friends, fighting their way round Murmansk in the teeth of the blizzard, and in the face of the unwelcome attentions of the Luftwaffe and the U-boat packs, are giving the matter their most serious consideration. Nor can we expect a carefully balanced judgment from the not inconsiderable number of our colleagues who are at the moment in enemy hands.

Your plea on behalf of a mythical centenarian covers only one side of the question. Every well-brought-up young man should be eager to profit from the advice of his elders, but it cannot be gainsaid that our venerable Nestors when talking to (or down to) their juniors are a little apt to dilate at length on the verdure of the fields of their youth and/or on the excellence of the Biblical injunction touching the matter of yokes and young shoulders. With particular reference to present, and to future, problems they tend to overlook the probability that post-war pastures will yield more thorns than grass, and that post-war yokes will be of a much heavier pattern than heretofore.

Planning now for the future of our profession is necessary, but the translation of the plans into action must be deferred until members of the profession, temporarily in the Forces, have returned home at the end of the war and have had time and opportunity to study the problem in all its aspects.—I am, etc.,

JOHN M. HENDERSON,
Major, R.A.M.C.

SIR,—I do not think the B.M.A. has ever made any serious attempt to find out why it is that seven out of every eight members are politically inarticulate. Does not this problem merit some attention at Headquarters? It is not enough for the Association to say that the machinery is there and that if members do not make use of it nothing more can be done.

The B.M.A., in appointing the Medical Planning Commission—without any mandate from its members—has assumed the responsibility of guiding the profession through the troublous times ahead. Very well then, is a C.O. who never leaves his office entitled to assume that his unit is a happy one because he never receives complaints from his personnel through the official channels? There is a reason for the apparent apathy of the average medical man towards his own political interests, but the Association will not find out what it is by sitting in Tavistock Square. I would suggest that "Centenarian" comes out into the Provinces and finds out for himself.

It is not that the ordinary doctor has no views on matters of vital importance to himself; it is that he cannot use the machinery provided to make those views known. Theoretically it should work very well, actually it does not, because a G.P. nowadays has no time to give to secretarial duties, Division meetings, visits to London, etc. Consultants and specialists can arrange their work to a large extent, but a G.P. is tied to the telephone in a way that is quite incredible to those who have not experienced it. And the ordinary G.P. represents two-thirds of the profession.

The A.R.M. is a clumsy and lazy way of canvassing the views of the profession. The political landscape changes from day to day; Representatives meet once or twice a year, and experience quickly shows a G.P. the futility of trying to put his views across through the official channels. No wonder he is exasperated into displays of the arrogance which so scandalizes "Centenarian." Let the Association take a lesson from the defence of Leningrad; during the siege Party members were in and out of the trenches day and night, encouraging, advising, and directing. They did not call men off work which they cannot possibly leave to hold meetings. The mountain will not go to Mahomet, and if Mahomet will not go to the mountain he will lose his status as a prophet. Association Representatives must contact the profession on the spot, and it is no good saying that it can't be done. Trade union officials and M.P.s do not find it impossible to contact their constituents.

G.P.s as a body are suspicious of the negotiations now proceeding; they are exasperated and may easily break away altogether. I forecast this eventuality in a letter to the *Journal* some months ago as the outcome of the appointment of the Medical Planning Commission. I should deplore this result as much as "Centenarian," and I should cordially agree with his expectation of being made a scapegoat.—I am, etc.,

Lancaster. C. J. STOCKER.

SIR,—I have often wanted to resign from the B.M.A. I have refrained because I considered that the head and not the heart was at fault; but how are you to remedy a mental defect in a corporation? You, Sir, claim that the B.M.A. merely represents its members' opinions. How can it represent some thousands of divergent ideas, especially when, as on most of the questions the last few years, which are basically financial, there are diametrically opposing groups of the "haves" and "have nots"?

Bacon observes that "truth is more likely to come out of error than out of confusion." Interpreted by Prof. Leonard Gamgee in his lectures: "The next best thing to being definitely right is being definitely wrong." Now, I do not advocate the Council acting rightly or wrongly in defiance of the members, but I do suggest that, given the very large agreement we have on very important minor matters—such as reasonable income, hours, facilities, etc., for medical men—it probably does not make much difference what major decisions are taken providing the Council does obtain a decision and act on it; but this would appear impossible when Representatives are sent from the local meetings with binding resolutions. They must come armed with the opinions they have formed at the local meetings but be prepared to formulate a policy of their own—i.e., of the Representative Meeting as a whole. How could Parliament carry on if each member could only vote on the majority instructions from his constituency?

As I would blame a clergyman for empty pews, so I would blame the B.M.A. (for the fault is too general for local blame) for lack of interest in its meetings. When a member can speak at the Divisional meeting knowing that even if his own resolution is not accepted it will bear some weight with his Representative, he will come to speak, but at present, unless he has exceptional and dangerous influence as a speaker, a man may justly say: "Why should I waste my time; the committee has everything cut and dried?" Finally, I would say that if this plan cannot be carried out, and if this stage of confusion is not to lead to an anaesthesia from which we wake to find that the Ministry of Health has removed not only our income but our independence, the only alternative is for the B.M.A. to remove our independence first, and then tell us exactly what we are to think and do.—I am, etc.,

Birmingham. W. BRIAN GOUGH.

SIR,—May I associate my name with those of your correspondents who are obviously dissatisfied with the present-day complacent attitude of the B.M.A.? I appreciate that we are ourselves largely to blame for not being more active members, but it is hard to attend meetings and follow the politics of the Association when the day is more than fully occupied with the professional side of one's life.

With post-war reconstruction and some form of State medicine imminent we must look to the Association to safeguard our interests—by interests I do not mean our pay, though this should be adequate and commensurate with our training, but our conditions of work and facilities for treating our patients. I am now referring to psychotherapy, which is in particular a long and exacting form of treatment. If this treatment is to become available for the quite large percentage of the population who are needing it, then it will have to be financed by the State; but how? And who will be responsible for advising the Minister of Health on these matters? Will there be a repetition of that state of affairs which was current after the last war, or will the present-day E.M.S. neurosis centres take over this responsibility?

It was while I was at one of these centres that I wrote two letters to the Editor, one for his own information and the other for publication, the former essentially dealing with the question of personnel and the unsatisfactory conditions at the centre where I was working. The latter was in response to a paper by Major Hadfield on war neurosis, and in this letter I was critical of the methods of recruitment and the general management of the neurotic soldier. As I had no acknowledgment of either of these letters, I concluded that I had touched on dangerous ground and that the B.M.A. was unwilling even to consider any criticism of Government procedure. So what of the future?—I am, etc.,

Bishops Stortford, Herts. D. N. HARDCASTLE.

*** In the *Journal* of May 18, 1940, the following editorial statement was made, and has since been repeated: "In view of the restrictions now imposed on the use of paper, and the increase in the rates of postage which came into operation on May 1, it will no longer be possible to acknowledge the receipt of letters and memoranda, etc., offered to the *British Medical Journal* for publication." Owing to heavy pressure on limited space it is possible to print only a selection of the large number of letters submitted for publication each week.—ED., *B.M.J.*

SIR,—May I take the liberty of congratulating you on your masterly exposition of the facts in your leading article "A Member Resigns"? I have seldom heard of such conceit and arrogance as shown in that member's letter. As a medical officer on active service in a fighting ship may I express the hope that the Service to which be belongs will in due course teach him manners. The B.M.A. is a boon; long may it live! —I am, etc.,

"NAVY."

Houses to Live In

SIR,—In your leading article entitled "Houses to Live In" (Jan. 30, p. 136) you review the memorandum on "Design of Dwelling Houses" drawn up by the Committee on Social and Preventive Medicine appointed by the Royal College of Physicians. In the course of this review it is stated: "The College believes it to be a sound principle not to segregate the tuberculous in colonies, but to have them in the general community, in houses in which at any rate one bedroom is favourably situated as regards access of sunlight and fresh air, and has special windows opening more widely than the usual pattern."

I doubt very much if the College as a whole believes anything of the sort. If the tuberculous, thus housed, never stirred outside their houses, there would be something to be said for this view; though how they would earn enough to pay the rent or to buy food I do not know. But if one assumes that these tuberculous people, who are to have special windows, are under the normal human necessity of finding work, is it suggested that they should work in the general community too, and travel to and from that work in public vehicles, which do not always have special windows?

Remembering that the Royal College would certainly not recommend this mode of life for sufferers from leprosy—a disease no more infectious and certainly less fatal than tuberculosis—I cannot think that it is recommended for the tuberculous; and I would venture to suggest that the Royal College might welcome an opportunity of dissociating itself from the somewhat eccentric belief which is attributed to it in the paragraph quoted. It is at any rate in strange conflict with the recent M.R.C. Report on Tuberculosis in Wartime. —I am, etc.,

London, W.1. W. LANGDON-BROWN.

*** The relevant section (p. 15) of the report of the College reads as follows:

"(1) *Tuberculous Persons.*—A number of progressive communities in England and Wales have given special consideration to the needs of the tuberculous in their housing schemes and the College believe that this principle is sound and deserves to be widely extended. In their view, however, it is not desirable to segregate tuberculous patients under any sort of colony conditions. They should be housed in the general community but subject to certain special safeguards. It is of great importance that, where a reduction of rent for tuberculous patients is permitted, or in the letting of houses to such patients, they should be subject to the following conditions of tenure:

"(*a*) That the patient and his family agree to accept regular clinical supervision by attendance at a tuberculous clinic or such other arrangements as the Medical Officer of Health may require.

"(*b*) That the family agree to regular visitation by the health visitor and to accept such measures of protection as the health visitor may suggest—e.g., the occupation of a separate room by the patient.

"It is neither necessary nor desirable to make these houses conspicuous, but they should be placed in such a way that one bedroom, at any rate, is favourably situated as regards access of sunlight and fresh air. Arrangements can also be made for the provision of a special type of window which can be opened much more widely than the usual pattern. Nothing should be done, however, to mark out such families as infectious persons and so give them an unenviable place in the general community."

Dietetics of Pregnancy

SIR,—Those who do not refer to the reports of the Toronto experiment, that of the People's League of Health, and that of the meeting at the Royal Society of Medicine may be misled by Mr. R. B. Fisher's letter (Jan. 30, p. 145) on the effects of diet in pregnancy. Had he been content to criticize the faults of the papers of the Toronto workers and the uncritical enthusiasm of the writer of the leading article of Jan. 2 he would have done useful service. But he has gone on to draw conclusions without presenting or considering the more satisfactory evidence of the Toronto workers. For example, they give in both their papers the clinical rating, at various stages of pregnancy, by an obstetrician who did not know to which group each patient belonged; in the second paper they give the percentage, in each group, who had no complications. If these data had not been given, Mr. Fisher's criticism that there is no way of telling how many patients exhibited complications would be justified. The average duration of labour was five hours shorter in the group whose diet was supplemented; 86% of the women in this group were suckling their babies at six weeks after delivery, as compared with 59 of the poor-diet group. These differences in favour of the supplemented group may not be significant in view of the smallness of the groups, but they cannot be ignored.

Mr. Fisher bases an argument on one of the meanings given to the word "miscarriage" in this country. However, Toronto is not in this country, and the *Journal of Nutrition* and the *Canadian Medical Association Journal*, in which the work was reported, are not English journals. One of the meanings given to the word "miscarriage" in America is interruption of pregnancy between the 20th and 28th weeks; abortion then means interruption before the 20th week, and premature birth interruption after the 28th week. As the Toronto workers wrote of abortion, miscarriage, and premature birth, in this order, and did not mention the occurrence of abortion after the 4th and 5th (or 5th and 6th) months, it is evident that they used the words in these senses. Mr. Fisher's argument that "miscarriage" occurs far more frequently before than after

the end of the 4th month, and that "any effect on the frequency of miscarriages must have been more magical than nutritional," falls to the ground. Had he taken the trouble to look up the meanings attached to the word in America he would have saved himself from writing several lines of argument based on an invalid premise. It is difficult to understand how he could write that "the frequency of miscarriages in the period of the experiment is surprisingly high, even in the supplemented group," when, as he reports correctly, only 20 lines further on, the incidence, during the period of the experiment, in the supplemented group was 0%.

Mr. Fisher writes that "the work of the People's League of Health has been dealt with ably and forcibly by Doyne Bell in a discussion at the R.S.M." Either Mr. Fisher is wrong in describing the report of this meeting in the *Proceedings* as "full" or Dr. Doyne Bell did nothing of the sort. He criticized one of the conclusions but said nothing about the other—that concerning the effect of diet on the frequency of puerperal toxaemia, of which the authors wrote: "The findings . . . assume a significance which it is hardly possible to overestimate."

It is hard to believe that Mr. Fisher intended his statement that a demand for the better feeding of pregnant women "is tantamount to an act of sabotage of the first magnitude" to be taken seriously. All the pregnant women in Britain could have double rations for the full nine months of pregnancy without seriously affecting the amount left for the rest of us; while the technical difficulties of allowing special food for this group have already been overcome.—I am, etc.,

Bishops Stortford. JOHN MARRACK.

Help for the Shipwrecked

SIR,—After the sinking of s.s. *Titanic* I carried out experiments with Dr. Argyll Campbell on the preservation of life in rafts and boats after shipwreck, the work being done at the National Institute for Medical Research and at the request of the Board of Trade. The results of the research were published in 1923 in the M.R.C. Spec. Report Series No. 73 on the katathermometer in studies of body heat and efficiency. The results proved that it was essential to keep the body from being over-chilled if rescue could be effected fairly soon. It was shown that a one-piece waterproof dress, designed for us by Sir Robert Davis, offered very great protection from sea-water and wind.

In the appointment of a committee to consider this subject the Medical Research Council seems to have taken no notice of this work. With the aid of Mr. Martin Hill, secretary of the Liverpool Steamship Association, I got in touch with the Ministry of Shipping and Transport two years ago and was able to advise the Ministry to provide a suitable protective dress, and to urge the supply of water above all, and biscuit as the best food, food being of least importance. The Ministry, in place of the one-piece dress of Sir Robert Davis, designed one consisting of overall trousers, a tunic, and a hood, the whole being made of light, yellow oilskin, and packed into the hood to be carried on the back by the sailors just as a gas-mask is carried. Of these dresses 200,000 have been issued, and the highest commendation has been made of their use, not only as a protection from cold but also in the Tropics; the bright yellow colour is seen from the air, and the hood has been found useful for catching rain. Gloves are provided for the tillerman, while others can for warmth withdraw their hands within the sleeves, which have an elastic cuff. The protective dress has "zip" openings in the legs, which allow the legs to be massaged if they become numb.

I have had submitted to me the detailed instructions given to the shipowners for provision of boats; the only new point, I think, stated in the recent report of the M.R.C. Committee is that foods rich in protein, because they increase the need for water, should be avoided. One of the most important provisions made by the Ministry is a lamp carried by each sailor which allows him to be picked up by the boats in the dark. One rescue ship made for what was thought to be a ship on fire and found numbers of sailors floating about with their red lamps glowing, buoyed up as they were by their life-belts.—I am, etc.,

Chalfont St. Peter. LEONARD HILL.

Pyogenic Skin Infections and the Skin-carrier Rate

SIR,—My address is, I hope, adequate apology for my delay in replying to Dr. George Discombe's letter (Sept. 26, p. 378). The controls were healthy personnel who had not suffered from impetigo to their knowledge. They were drawn wherever possible from the same units as the patients and were living under the same conditions. The swabs were taken on admission, the patients having had no treatment for the preceding 24 hours. All group A patients were suffering from impetiginous lesions of the face and/or neck. They were not suffering from boils.

In the original more extensive notes from which my article was compiled, I did, in fact, calculate percentages as Dr. Discombe has done. I agree that they appear more striking. In that they could be extracted by anyone interested from the table I gave, I preferred to return all figures as percentages of the whole group, a more direct and, I believe, more just method of presentation. I knew full well that it would be less dramatic.

I have not my original notes with me, and, therefore, must accept Dr. Discombe's statistical corrections of the percentages for the β-haemolytic streptococci. I know Dr. Bradford Hill's book well. I confess at the time of writing the article I was more interested in the distribution of the pathogenic staphylococci. I hope I have answered his questions.—I am, etc.,

NICHOLAS H. MARTIN.

Filaria Worm in the Eye

SIR,—When I was in N.E. India over 40 years ago worm in the eye was very common in horses, and I had quite a collection which I removed myself. It was necessary to immobilize the horse, which was no easy matter but essential if you did not wish for a possible disaster to your operation or yourself, cocainize the eye, then wait, while kneeling on the horse's neck, for the worm to appear in the anterior chamber, and plunge a well-guarded knife slantwise into the anterior chamber. The worms varied in length from 1½ to 2 inches.

The eye was always inflamed and the cornea opaque with a milky fluid before operation, but cleared up in a few days with the application of yellow oxide and atropine ointment. This inflammatory condition was the first warning of eye trouble, the syce remarking that the eye was "sick with running water." The condition frequently destroyed the eye. It was believed that the disease "kumree," then very common among horses, was caused by these worms becoming encysted in the spinal cord, the symptoms being progressive paralysis and dragging of the hind quarters, culminating in complete paralysis.

Later in Nigeria I found filaria very common, and I was myself a sufferer with worm in the eye, which at times caused me some inconvenience. I have frequently seen it wriggling in my eye and under the skin of my temple. The trouble lasted six years and was preceded by a calabar swelling. The worms are also common in antelopes. I have removed some of several inches from the pleurae; the animals never appeared to be out of condition.—I am, etc.,

Bournemouth. E. A. CHARTRES.

Aetiology of Lung Cancer

SIR,—In the leading article "Aetiology of Lung Cancer" in the *Journal* of Feb. 13 (p. 194) there is some criticism of my paper on "Lung Tumours in Mice and Man" (p. 179). I tender the following reply.

After referring to the high incidence of lung cancer in the Schneeberg and St. Joachimsthal miners, attention is drawn in the leading article to the differences between the mouse and human lung tumours. It is stated: "The first and most obvious [difference] is that lung tumours are exceptionally common in some strains of mice; their incidence in control animals in some of these experiments was 20%." I cannot see how this differs from the condition in the above-mentioned miners. Surely, it is a resemblance, not a difference, between the mice and human beings. Further, it is stated that in mice the lung tumour is usually an adenoma in which malignant change is the exception. This was certainly not the case in the experi-

ments with the dusts, where the malignant tumours were more numerous than the simple adenomas.

I have not stated that nodular silicosis gives rise to cancer of the lung. My mice did not develop nodular silicosis of the lung during the dusting with silica, although the incidence of lung tumours was definitely increased and there were silicotic nodules in the tracheo-bronchial lymph nodes of about half the mice. In a previous paper I have suggested that when silicosis of the lung—i.e., the nodular condition—develops it may inhibit cancer development. Further, silicosis itself may be considered a type of multiple tumour, although not malignant, of course. In my experiments with iron oxide dust the resulting tumours were more numerous and more malignant than those produced by silica dust. I consider iron oxide at least as active as silica in the case of mice and man.

At no time did we find the dusting experiments tedious, since we were the first (1932-4) to obtain positive results. This is due to paying proper attention to the time and other factors. Other researches obtained negative results because their experiments were of too short a duration or they used non-susceptible animals as subjects. The main object of our experiments was to obtain clues to prevention or cure of lung cancer—a difficult problem and not easy to approach.—I am, etc.,

London, N.W.3. J. ARGYLL CAMPBELL.

Small-pox in Scotland in 1942

SIR,—At a meeting of the Section of Epidemiology and State Medicine of the Royal Society of Medicine on Jan. 22 I did not state, as reported in the *Journal* of Feb. 13 (p. 199), that encephalitis following vaccination did not occur in infancy, but merely emphasized its rarity during that period, and referred to a paper (*Brit. J. Child. Dis.*, 1930, **27**, 245) by Dr. T. F. McNair Scott, who could find only 41 cases of this kind. It is, therefore, most desirable that vaccination should be performed during the first year of life.—I am, etc.,

Kensington, W.8. J. D. ROLLESTON.

The Measure of Night Vision

SIR,—Mr. N. Bishop Harman (Jan. 9, p. 43) has rightly emphasized the importance of a standard degree of illumination in the estimation of night vision. This need has also been recognized by military ophthalmologists, and all Army night-vision sets are tested by a photometer and the calibration of individual instruments determined in relation to a fixed standard.

Two facts should be differentiated in the investigation of night vision—namely, the rate and degree of adaptation. I am interested to note that Mr. Harman's figures are similar to mine in that there is a deterioration with age, although it is probably more in rate than in degree.

Mr. Harman credits me with the Army test, which I hasten to disclaim. It was devised by Dr. Craik of the Psychological Laboratory, Cambridge, under the auspices of the Medical Research Council, and is in general use throughout the Army.—I am, etc.,

B. W. RYCROFT,
Major, R.A.M.C.

London, W.

Artificial Respiration

SIR,—May I answer some points made by both private and public correspondents? Dr. W. J. Burns Selkirk (Feb. 6, p. 173) writes that when the Schafer operator withdraws his pressure gravity causes the viscera to resume their former position, and that the more toneless the viscera the more vigorous will be their resumption. If he will try Schafer on a dead body he will see how much "vigorous resumption" there is compared with a live and bouncing patient. My article (Dec. 26, p. 751) was based on practice because of the conflicting figures of theorists and of the lack of scientifically controlled work on drowned men. But in theory Eve's method is also far superior. Schafer admits the necessity for raising the hips to allow water to drain out of the upper chest; this is done throughout rocking, not just for a preliminary moment. But rocking scores most during inspiration. Gravity, acting on heavy organs at 45 degrees, pulls down the diaphragm by the visceral ligaments. Is it not likely to be superior to a method which depends on almost non-existent elasticity and on the effects of gravity acting—owing to the displacement of the viscera by manual pressure—through only 5 or 10 degrees? In Schafer the viscera can do no more than roll gently back into their original position; in rocking they slide strongly down towards the pelvis, exerting a powerful diaphragmatic pull and positive inspiration.

I have good reason to believe that statistics of the results of artificial respiration during this war will come as an unpleasant shock. If, as has been said, this is due to faulty technique, Schafer's method must be far from simple, for it is applied at sea by specially trained and practised doctors and first-aid men. If these men cannot apply it properly, why teach only Schafer to quickly trained men when there is such a very simple alternative?

It appears from preliminary work that Eve's method is likely to be superior in its effects on the circulation also. Rocking asphyxiated babies has been the method of choice of many obstetricians for years. Although the baby may be wrapped in blankets and rocked in the arms, it may be better to use a warm old-fashioned rocking cradle. As both circulation and respiration are stimulated without producing shock, it may prove as applicable to "white babies" as it is to blue ones.

Finally, may I beg enthusiasts not to imperil the method again by inventing special apparatus. A stretcher and some support is quite enough. (A possible exception to this may be the fitting of a foolproof clutch to the tilting system of operating tables so that "anaesthetic asphyxias" may be rocked.) For ten years—during three of which hundreds of men have drowned—this life-saving method has been in abeyance because of the impression that apparatus is a necessity.—I am, etc.,

G. H. GIBBENS,
Surgeon Lieutenant, R.N.V.R.

Starvation in Europe

SIR,—The public and the medical press within recent months has drawn attention to the gravity of the food situation in the occupied countries of Europe. Leading articles on the subject have appeared in the *British Medical Journal*, in the *Lancet*, and in several newspapers (e.g., *Manchester Guardian* and *Sunday Times*). It is doubtful, however, if the true proportions of the emergency are yet generally realized. From many and authentic sources there is pouring into this country a mass of information which leaves no doubt that in some regions (e.g., Belgium, Greece, and France) a state of virtual famine exists. Much of this information comes from trained neutral observers (Swedish and Swiss) who have in many instances been engaged in Red Cross relief services in the countries concerned. From Greece, for example, there is conclusive evidence that large numbers of the population have been reduced to the state of "living skeletons," that many have died in the streets, and that in some districts of Athens 9 out of every 10 children born have died within six months. In Belgium the position is also grave. Dr. E. J. Bigwood, a distinguished public health worker, whose investigations for the League of Nations are well known, has given striking evidence in a recent memorandum (Dec. 4, 1942). He points out that a major factor in determining the famine situation in Belgium is that, whilst this country in pre-war days derived about 70% of its bread cereals from over-seas, the blockade has shut down this main source of bread and of the cereal feeding stocks for animals. These have had to be slaughtered with a consequent wholesale reduction in meat, milk, cheese, and other dairy produce. Dr. Bigwood has shown that the mortality rate is rising steeply, due mainly to a spread of tuberculosis and to the deaths of infants from infectious diseases, especially bronchopneumonia, and that among the survivors deficiency diseases, such as hunger oedema, scurvy, anaemia, and rickets, are common. Even as early as 1941 in Brussels there was a stunting of growth in 56 to 78% of children of pre-school age and in 51 to 84% of school-age children, whilst for the adolescent the situation is described as tragic. According to the main infant clinics in Brussels the infantile mortality had increased by 300 to 400% even before April, 1941. The condition of mothers is equally grave. During pregnancy women fail to gain their proper increment of weight, and, as the four chief university obstetric clinics in Brussels, Ghent, Liége, and Louvain have shown, by January, 1942, the incidence of premature births had increased by 300%. The incidence of tuberculosis in pregnant women had increased by 100%. The poor nutritional state of the nursing mothers is exemplified by the fact that the mortality was as high in breast-fed as in other infants.

It is apparent that the famine is affecting with tragic emphasis the mothers and children of Belgium and Greece and, as

Dr. Kershner has shown, of France. To these countries some Red Cross relief is being conveyed by Swedish, Swiss, and Turkish agents, but the shortage of materials on the Continent generally imposes a serious restriction on these efforts.

It is for these reasons that the Famine Relief Committee has sought permission from the Allied Governments for "navicerts" to send 2,000 tons of dried milk and vitamins each month to Belgium and Greece in neutral ships to be devoted especially to the succouring of the starving mothers and children. Their estimate is based upon an assessment of the needs of these countries drawn up by an influential committee containing such distinguished authorities as Dr. Harriette Chick and Prof. J. C. Drummond. It is understood that the foodstuffs and ships are available, that the Governments of Belgium and Greece are willing to defray the cost of materials and transport, and that the Red Cross Societies can make the appropriate arrangements with the occupying Power and the other Governments concerned. Recently the Prime Minister of Belgium stated that his Government had decided to ask the Allies for "navicerts" for these moderate quantities of foodstuffs to save the lives of the young people of his country. It is understood that the Famine Relief Committee, whose chairman is the Bishop of Chichester, has the support of the Archbishops of Canterbury and Westminster.

The object of this communication is to draw the attention of the medical profession of this country to the catastrophe which is rapidly overwhelming Europe and to the urgent need for an impartial consideration of measures directed to the relief of those members of the community who always suffer severely in a famine area—namely, the pregnant and nursing women and the children. To realize the measure of the emergency it is only necessary to remember that the area covered by the blockade is many times greater than that which existed during the last war. During that war the situation in Northern Europe, moreover, was ameliorated by the large relief shipments of food (100,000 tons a month) to Belgium under the Hoover Scheme.

This plea for an unprejudiced consideration of a moderate relaxation of the blockade before the tragedy of irretrievable disaster breaks upon Europe is made with a full consciousness of the sanction inherent in the blockade as a potent instrument for speeding the downfall of Nazi tyranny and the time when the starving peoples will be re-fed. It is based upon the conviction shared by the Famine Relief Committee and others who have studied the question closely that a considerable and perhaps critically important amount of relief can be conveyed to Europe and distributed under adequate Red Cross control without endangering the military efficacy of the blockade.

There is conclusive evidence from the neutral Red Cross agents in the occupied countries that the relief food materials already sent are controlled for the benefit of the local populations, and there is implicit in their reports the conviction that the additional shipments which they so earnestly demand would be distributed under equally secure control. This conviction must be shared by the starving peoples themselves. There is the risk that refusal on our part to send relief to the utmost of our power, within the restrictions necessarily imposed by the blockade, will tend to rouse a just indignation in those who are despoiled of aid which their own Governments in this country are anxious to send, and which they are entitled to expect. Further, as the *Manchester Guardian* points out, "to refuse 'navicerts' for this purpose would be to add wantonly to the difficulties of post-war recovery."

—I am, etc.,

JAMES YOUNG,
Professor of Obstetrics, University of London.

London, W.12.

Obituary

W. J. TURRELL, M.D., D.M.R.E.

We regret to record the death recently at the age of 77 of Dr. W. J. Turrell, consulting physician to the department of physicial medicine at the Radcliffe Infirmary, Oxford.

Walter John Turrell, the son of the Rev. H. J. Turrell, was born in 1865 and was educated at Turrell's Hall and Exeter College, Oxford. He pursued his medical studies at the London Hospital, and took the M.B., B.Ch. of his university in 1890, proceeding to the M.D. two years later. In 1921 he took the D.M.R.E., Cambridge. After qualifying he was house-surgeon at the Radcliffe. In the war of 1914-18 Dr. Turrell served as a major in the R.A.M.C.(T.), and was in charge of the physiotherapy department of the Third Southern General Hospital at Oxford. Dr. Turrell did much to develop his specialty in this country, and his distinction in this field was recognized by his transatlantic colleagues when in 1933 he was awarded the Golden Key for research in electrotherapy at the American Congress of Physiotherapy. He was president of the Duchenne Society for the Advancement of Physiotherapy, which he founded in 1934, and was at one time president of the Electrotherapeutic Section of the Royal Society of Medicine. At the Annual Meeting of the B.M.A. at Oxford in 1936 Dr. Turrell was president of the Section of Physical Medicine, having previously served as vice-president of the Section of Radiology and Electrology at the Portsmouth Meeting in 1923. He was a member of Council, 1912-13. He contributed an article on electrotherapy to the 13th edition of the *Encyclopaedia Britannica*, and wrote widely on the subject.

We are indebted to Dr. P. BAUWENS for the following appreciation: The sad news of Dr W. J. Turrell's death must have filled the hearts of his friends and colleagues with the deepest sorrow. Some will remember him as a teacher, others as a research worker bent on putting medical electrology on a scientific basis. Yet others will think of him as one whose ingenuity enabled him to put to use such prosaic objects as skewers, primus prickers, funnels, inner tubes, or jam jars, and convert them into effective electromedical apparatus. He will live in the memory of all who knew him as a great man. The furtherance of his branch of medicine was his constant concern. To this end he founded the Duchenne Society for the Advancement of Electrotherapy in 1934. The members of this society will wish to pay the highest tribute to the memory of their late president. A short monograph entitled *John Wesley, Physician and Electrotherapist* he ended with the words: "There are some men whose voices echoing through the past we still seem to hear, and whose past deeds and writings continue to influence the future." Such words could not have been more appropriate had he himself been the object of the monograph.

Dr. F. HOWARD HUMPHRIS writes: The loss that we have sustained by the death of Turrell of Oxford is difficult to assess properly or to appreciate at its true value. He was a great-souled English gentleman, single-minded, with an abiding purpose—that purpose, the aim and object of his life, was the putting of England in the forefront of nations in the use and practice of electrotherapy. That his knowledge of that science qualified him so to do, and made him a leader of it who could have accomplished that object, his writings and his book on the subject afford ample proof. In the U.S.A., a country more enlightened than most in the art and science of electrotherapy, Turrell's greatness was liberally and generously recognized. He was one of the first three European medical men to be awarded the Golden Key for distinguished service to electrotherapy. His place cannot be filled. His loss to medicine in general, and to electrotherapy in particular, is irreparable.

G. W. CRILE, M.D., LL.D.

Prof. GREY TURNER writes: George Crile will always be associated with what is so often spoken about as "surgical" physiology, for in his early days he spent most of his energies trying to find out how the body reacted to disease and especially to the traumatism of surgical intervention. His early work on shock is apt to be forgotten, but his idea of trying to control the peripheral circulation by the wearing of a rubber suit was certainly a notable contribution. His name ought always to be remembered in connexion with the revival of blood transfusion, for in that field he was an early worker and taught us a practical method of making the direct connexion between the arteries of the donor and veins of the recipient. It was Sir Henry Butlin who insisted on the necessity for removing the corresponding lymph nodes when operating for malignant disease of the tongue, but it was Crile who taught us the most convenient way of carrying this out by the plan of operating which is now universally known as "Crile's method." His idea of "stealing the thyroid" was an important feature of the management of the worst cases of hyperthyroidism in his hands. None of those who visited his clinic will ever forget the arrangements that were made for carrying out this plan. Each thyroid patient was nursed in a separate room and the ritual associated with the early stages of general anaesthesia was gone through on several successive days, until

finally on the selected morning, which was not known to the patient, anaesthesia was carried to completion and Crile operated in the patient's room. Several of these operations would be carried out on any one day, and Crile fairly ran about from room to room operating in each and with great success. His interest in the suprarenal was greatly stimulated by his experience as a surgeon with the American Army during the last war. It was in furtherance of his interest in the ductless glands that he and Mrs. Crile made a game-hunting expedition to Africa not long before this war with the object of collecting, examining, and carefully weighing the suprarenals and other ductless glands obtained from the animals that fell to his gun, the idea being to correlate these facts with the size and habits of the animals concerned. It was a wonderful evidence of his resilience that when he had to retire from the Lakeside Hospital on attaining the age limit of 65 he at once transferred his energies to the large private institution known the world over as the Cleveland Clinic, where he continued to work almost to the time of his death. Always a good friend to this country, he acted for years as a sort of liaison officer between the surgical profession here and in America, and he never lost an opportunity of keeping those relations warm. He was tremendously elated at his election to the Honorary Fellowship of our own Royal College in 1913 and was most enthusiastic about what he called the delightful ceremony at the time of his admission during the presidency of Sir Rickman Godlee. In his own beautiful home in Cleveland he was the perfect host, and those who had the privilege of staying there must also cherish vivid recollections of those wonderful week-ends spent at his country estate, where he seemed to find such relaxation in the saddle. He had a great gift for friendship, which he followed with as much enthusiasm as the pursuit of his profession, and he will for long be remembered by hosts of surgeons the world over.

We regret to announce the death on Jan. 9 of Dr. MICHAEL BEHR of Swindon at the early age of 41. Dr. Behr was born in South Africa and came to this country to complete his medical studies at the Middlesex Hospital, qualifying M.R.C.S., L.R.C.P. in 1926. He was appointed an assistant medical officer to the G.W.R. Medical Fund Society of Swindon in 1927, and for the past 16 years has been one of the most popular members of the staff. He was especially interested in midwifery, and conducted ante-natal clinics for the Borough of Swindon and was on the staff of the maternity hospital, where his services as obstetrician were in great demand. His ability, his courtesy and kindness endeared him to all his patients, and he was held in high esteem by his professional colleagues. He regularly attended meetings of the local Division of the B.M.A. and was a member of its executive committee. His untimely death, following an attack of coronary thrombosis ten months before, has robbed the medical profession and community of Swindon of an outstanding personality, whose services will long be remembered with gratitude and whose place it will be difficult to fill. He adhered faithfully to his Jewish religion and closely followed its observances. Dr. Behr leaves a wife and young son of 13, to whom sympathy will be extended in their tragic loss.—J. L.

We regret to announce the death on Jan. 13 after a long illness of Dr. T. L. DRAPES of Chepstow. Born at Enniscorthy, Co. Wexford, in 1877, Thomas Lambert Drapes was educated at Epsom College and Sidney Sussex College, Cambridge, of which he was a scholar. He took his B.A. with first-class honours in the Natural Sciences Tripos of 1900, and then went to St. Mary's Hospital, where he won the Meadows prize in obstetrics in 1903, and qualified M.R.C.S., L.R.C.P. in 1904. He later held the post of house-surgeon, and in 1906 graduated M.B., B.Chir. In the same year he went to Chepstow to join the practice of Dr. Lawrence, eventually succeeding to it on the latter's retirement. He was also medical officer of health to the Chepstow Urban and Rural District Councils. Dr. Drapes was a keen member of the B.M.A., which he joined in 1909, and only resigned when he became ill in 1935. He was chairman of the Monmouthshire Division in 1931-2. He was awarded the M.B.E. for his services during the war of 1914-18. Interested in sports generally, he found his chief relaxation in a day's racing, of which he was very fond. Dr. Drapes was the kindest of men, unsparing of himself in his patients' interests, and possessed of much charm of manner; these, combined with marked professional ability evoked the affection of all his many patients in a very large practice. He was the ideal general practitioner.

The Services

The King has approved the following appointments and awards in recognition of gallant and distinguished services in the Middle East during the period May to Oct., 1942:

K.B.E. (Military Division): Major-Gen. P. S. Tomlinson, C.B., D.S.O., late R.A.M.C.

C.B. (Military Division): Brigadier A. J. Orenstein, C.M.G., C.B.E., South African Forces.

C.B.E. (Military Division): Major-Gen. D. C. Monro, late R.A.M.C.; Brigadier (temp.) E. Phillips, D.S.O., M.C., late R.A.M.C.; Col. H. G. Furnell, D.S.O., Australian Military Forces; and Col. T. D. MacG. Stout, D.S.O., O.B.E., New Zealand Military Forces.

O.B.E. (Military Division): Col. (acting) D. Bluett, R.A.M.C.; Cols. (temp.) N. Cameron, A. T. B. Dickson, and J. Morrison, M.C., R.A.M.C.; Lieut.-Cols. J. Chandra and W. E. R. Dimond, I.M.S.; Majors (temp. Lieut.-Cols.) H. S. Allen, M. R. Burke, G. A. H. Buttle (Reserve of Officers), R. K. Debenham, and C. B. Levick, R.A.M.C.; and Major A. E. Porritt, R.A.M.C.

M.B.E. (Military Division): Capts. (temp. Majors) A. H. R. Champion, J. W. A. Dennis, E. B. Hacking, R. J. Kellar, W. H. Purves, H. L. W. Sixsmith, and B. C. Tate, R.A.M.C.; Capt. (temp. Major) J. Revans, I.M.S.; and Capt. B. De Burca, I.M.S.

M.C.: Capts. (temp. Majors) C. H. George and M. S. Williamson, R.A.M.C.; Capts. B. A. M. Brown and W. Darby, R.A.M.C.; Capt. V. F. Siqueira, I.M.S.; and Capt. S. Kapila, I.M.S. (Reserve of Officers).

CASUALTIES IN THE MEDICAL SERVICES

Prisoners of War.—Capt. J. R. Gibbs, R.A.M.C., Capt. J. H. Gibson, R.A.M.C., Temp. Major J. W. D. Goodall, I.M.S., Capt. J. W. Lillico, I.M.S., Capt. J. F. McGarity, I.M.S., Capt. F. E. McLaughlin, I.M.S., Temp. Major R. Stuppel, R.A.M.C.

Wounded.—Capt. W. K. Badgett, R.A.M.C., Capt. R. W. Davidson, R.A.M.C., War Subs. Capt. R. C. Meek, R.A.M.C., Lieut. D. T. Milnes, R.A.M.C., War Subs. Capt. S. D. V. Weller, R.A.M.C.

Missing.—Capt. G. F. Allan, R.A.M.C.

Wounded or Injured.—Prob. Temp. Surg. Lieut. A. E. de la T Mallett, R.N.V.R., Temp. Surg. Lieut. G. R. Walker, R.C.N.V.R.

DEATHS IN THE SERVICES

Lieut.-Col. DONALD DE COURCY O'GRADY, D.S.O., R.A.M.C. (ret.), died on Jan. 28. He was born on May 31, 1881, the son of Capt. S. de C. O'Grady, and was educated at the Naval College, Eltham, and at Dublin, where he took the L.R.C.P.&S.I. and the L.M. in 1905. After holding a house post at the Royal City of Dublin Hospital he entered the R.A.M.C. and became a specialist in dermatology while serving in India. During the war of 1914-18 he was mentioned in dispatches and was awarded the D.S.O. and the Croix de Guerre. After his retirement he settled in practice in East London. He leaves a widow.

Universities and Colleges

UNIVERSITY OF CAMBRIDGE

The Raymond Horton-Smith Prize for the best M.D. thesis during the academical year 1941–2 has been awarded to E. T. C. Spooner.

ROYAL COLLEGE OF SURGEONS OF ENGLAND

A meeting of the Council of the College was held on Feb. 11, with Sir Alfred Webb-Johnson, President, in the chair. A resolution of condolence was passed on the death of Sir Arbuthnot Lane, past member of the Council. Mr. W. H. Bowen and Mr. P. J. Moir were re-elected members and Mr. N. F. Sinclair, Mr. W. D. Doherty, Col. A. H. Whyte, Surg. Cmdr. J. B. Oldham, Brig. H. C. Edwards, Mr. B. H. Burns, and Surg. Capt. L. C. Rogers were elected members of the Court of Examiners for one year from March 11, 1943. Miss Alice Bloomfield was elected an Examiner in Midwifery under the Examining Board in England for the remainder of the year 1942–3. It was decided to recognize the post of resident surgical officer at the Chelmsford and Essex Hospital for the six months' surgical practice required of candidates for the Final Fellowship Examination. Mr. H. S. Souttar was appointed Bradshaw Lecturer and Mr. J. Johnston Abraham Thomas Vicary Lecturer for 1943. Mr. H. E. Griffiths was appointed a Hunterian Professor for 1943 in place of Mr. W. Bremner Highet. It was reported that new by-laws had been approved giving the College power to make

the Primary Fellowship Examination solely postgraduate and to add pathology as an additional subject. Revised regulations will be published at a later date and the new regulations are likely to come into force in 1944. In view of the many inquiries which had been received it was decided to continue the opposition of the College to the extension of the scope of the Mrs. Emily Wilson Barkworth Trust. A letter was received from the Winnipeg Medical Society thanking the Council for a relic of Museum furniture which had been converted for use as a gavel. Dr. J. Newman Morris, F.R.A.C.S., was introduced and conveyed a message of greetings from the Royal Australasian College of Surgeons. In return the President handed to him, as a token of friendship to the sister College, a first edition (1664) of Willis's *Anatomy*, the illustrations of which are by Sir Christopher Wren.

Diplomas of membership were granted to J. M. Titcombe and Mary W. P. Huddart and to the 221 candidates whose names were printed in the report of the meeting of the Royal College of Physicians of London in the *Journal* of Feb. 20 (p. 238), and Diplomas in Public Health were granted to the 9 candidates whose names were printed in the same report.

Medical Notes in Parliament

Beveridge Report: Health Provisions

Sir JOHN ANDERSON, on Feb. 16, speaking on a motion proposed by Mr. Greenwood welcoming the report of Sir William Beveridge on social insurance, said he would deal first with the proposal for a comprehensive medical service. This implied the reorganization of the panel practitioner system of National Health Insurance, existing general and specialized health services of local authorities, the major hospital and institutional services, and so on, and their development into one unified and comprehensive service covering the people as a whole. The Beveridge report viewed this as a service organized not by the proposed Ministry of Social Security but by the Health Departments and designed for positive health and prevention of disease as much as for treatment and cure.

The Government welcomed this conception of a reorganized and comprehensive health service. It was the consummation of a process which had been going on steadily under successive Governments for many years—a constant movement to improve and make more comprehensive the personal health services. Some 18 months ago the Minister of Health had announced the general lines of a plan for reorganizing the hospital services. The Health Departments had given attention to other aspects of the personal medical services, including, particularly, the draft interim proposals of the Medical Planning Commission of the B.M.A. It would be premature to attempt now to formulate details of the new scheme, and the Beveridge report made no such attempt. On all these matters the Health Departments would seek the help of the main organizations—local authority, voluntary, or professional—on whose active participation the success of any reorganization must depend. In consultation with these the shape of a new service would be worked out and then necessary legislation would be prepared.

Main Features

For the moment it would suffice to indicate some of the main features which, in the Government's opinion, must determine the general nature of the reorganization. The object was to secure through a public, organized, and regulated service that every man, woman, and child who wanted it could obtain, easily and readily, the whole range of medical advice and attention through the general practitioner, the consultant, the hospital, and every related branch of professional up-to-date method. The fullest possible use must be made of existing resources, such as the tuberculosis, cancer, and other services of the local authorities. The principle of the new service must be one of co-operation of public authorities, voluntary hospitals, and other voluntary agencies, and of the profession towards one common end. There must be no doctrinaire scrapping of good existing resources, nor must there be overlapping. Responsibility for seeing that in any area the service was full and efficient must be ultimately on one public authority. Experience justified putting this ultimate responsibility in any area on to the local government machinery, working often over larger areas and certainly in consultation and collaboration with voluntary agencies.

Private Practice and the Family Doctor

Professional interests, the well-being and integrity of the medical profession, not only one of the oldest and most honourable, but one on which the success of any scheme would inevitably depend, must be amply and properly safeguarded. The Government recognized that the profession was approaching this major reorganization in the progressive spirit which was expected of it. Most important of all it was necessary to maintain to the greatest possible extent the principles of free choice of doctor and of the family doctor relationship as the background of general medical practice, to create the least possible disturbance of existing association between doctor and patient. In the view of the Government this need not be inconsistent with group public practice and well-equipped clinical centres, a project which underlay most of the current thought on the future of family practice. The Government had no intention of forcing the new services on those who preferred to make private arrangements for medical attendance or hospital treatment. Equally the position of the great voluntary hospitals must be safeguarded.

In general the public health services of this country could already challenge comparison elsewhere. But with the war and the chances of post-war reconstruction there was an opportunity to pull together many loose strands and to build up the whole service until it justified in every sense the word "comprehensive." This opportunity would be quickened by the mass return of young doctors from the Forces. The Government did not intend to let that opportunity be missed. For certain forms of treatment—notably dentistry and ophthalmology and possibly also obstetrics—there was a marked deficiency of personnel, and it must inevitably be many years before this shortage could fully be made good.

Dr. HADEN GUEST asked whether the unified and comprehensive medical services were to be available for all members of the community, irrespective of their income. Sir JOHN ANDERSON said the scheme was comprehensive in two senses: it would cover all forms of treatment and it would extend throughout the community. That was the decision of the Government. Dr. GUEST then asked whether the Government could announce any plan for increasing the number of medical personnel. What was it doing to increase the number of women doctors? Sir JOHN ANDERSON said that matter was under discussion.

Children's Allowances

Continuing, Sir John Anderson said that before the publication of the Beveridge report the Government had concluded that whatever might be decided about children's allowances in cash, the most effective measure was full development of child welfare services, which brought benefits directly to the children. As a matter of current policy some 2,000,000 out of 5,500,000 children in grant-aided schools would be provided with dinner before long. It was the view of the Government that cash allowances to parents, if granted, should not be at a rate which would prove an obstacle to the fullest development of the welfare services, and the Government was ready to consider extending these benefits free of cost as part of its scheme. It saw no difficulty in providing services equivalent in money value to 2s. 6d. a head, or even more, per week, as against the 1s. assumed by Sir William Beveridge. For that and for other reasons the proposal of the Government was that the rate of children's allowances should be fixed at 5s. for the second and other children instead of the 8s. recommended in the Beveridge report.

Approved Societies

On what he termed the controversial question of the approved societies, Sir John said that under the existing system of health insurance the sickness risk was separated from other insurance risks with which it would be associated under the Beveridge plan, and there was a voluntary segregation of risk on a large scale within the field of sickness insurance itself. The question now was whether the continuance of approved societies as independent financial units was compatible with a unified system of social insurance under which uniform contributions provided for uniform rates of benefit. Inasmuch as the approved society system was one of unequal benefits for equal contributions, there could be only one answer to that question. It was no light matter to discard institutions which had become part of the social system, and if any method could be devised whereby the societies could continue as agents in administration of the national scheme the Government would gladly consider it. The Departments were considering alternative suggestions.

The Government agreed that what was called in the report a funeral grant, but which it preferred to call a death grant, should be a benefit under the unified system of social insurance. The amount of the benefit required further consideration. Sir John concluded by pointing out that there could be at present no binding commitment. Subject to that, the Government adopted the scheme in principle, and no reservations which he had made would affect the speed and vigour of its preparations. The Government would press forward the preparation of a Bill or group of Bills. When this work had been completed it would review its policy, and Parliament would have an

opportunity of pronouncing on the scheme as a whole in relation to other schemes and in the light of the financial situation as it could be estimated at that time.

"A Revolution in Medical Ideas"

When the debate was resumed on Feb. 17 several members criticized the statement of Sir John Anderson on the ground that it should have indicated a Government decision to take immediate steps to carry out the recommendations of the report. Sir KINGSLEY WOOD reaffirmed the declaration of Sir John that immediate pledges could not be given. He said the setting up at this moment of a Ministry of Social Security would retard the preparation of schemes arising out of the report. Responsibility for the comprehensive medical service must lie with the Minister of Health, and if they tried to interpose a new Minister they would only hamper and hinder the machine. In the future they might find a place for a Minister of Social Security, but his duty would not be matters like a comprehensive medical service, but rather such matters as the collection of contributions and things of that kind.

With regard to the comprehensive medical service, Mr. Brown and Mr. Johnston would immediately begin negotiations with the medical profession on the lines set forth in the Beveridge report. As one who went through the negotiations in 1911, Sir Kingsley said the task of these two Ministers was considerable. If, as they all hoped, they could bring about the changes which had been outlined already it would mean considerable adjustment as regards general medical practice and all that went with it. Almost a complete revolution in medical ideas and prospects was outlined. In 1911 great hopes were pinned upon the panel system. He did not think many people would pin so many hopes upon it to-day. They would like to see that comprehensive range of services which had been forecast by Sir William Beveridge and many others. These negotiations by the two Ministers and the setting up of this new system would take a considerable time. When dealing with a great and honourable profession such as the medical profession matters had to be settled with the utmost amount of good will on both sides.

Voluntary Hospitals

On Feb. 18 Mr. HERBERT MORRISON wound up the debate. He said the Government accepted the six fundamental principles of the Beveridge report save for the subsistence basis. It accepted the assumption in the report of a comprehensive health service and children's allowances. The health service was on the basis of universality, free benefit, no means test, medical reorganization, and so on.

Dr. MORGAN: And popular control of hospitals? Does the Government accept representative control of hospitals?

Mr. MORRISON replied that he had had a good deal of relationship with voluntary hospitals and had started on the principle that he rather wished them to be taken over. But this was a country in which there would always be voluntary effort, voluntary social service, voluntary public service. If that died in this country British democracy would be dead. That was not to say that voluntary hospitals ought necessarily to be preserved. He nearly had the offer to take them over in London but found they were doing good work, and that to take them over would cost the ratepayers a 1s. 6d. county rate. He had said the transfer could be postponed. Was a voluntary hospital necessarily wrong? There were voluntary hospitals in mining communities to which the miners often attached the utmost value. The Government thought it right to intimate that it did not propose to destroy the institution of voluntary hospitals. If it had declared that it would destroy them controversy would certainly develop. The Goyernment had committed itself, subject to certain reservations, to a very big change—a comprehensive public health service. It was working hard to get to the next stage. Mr. Johnston was meeting his Medical Advisory Committee for Scotland to discuss the report with them. Mr. Ernest Brown was likewise going ahead straightway with his negotiations. Other discussions would also go on and not only with doctors. Local authorities, voluntary hospitals, and all sorts of people, including the trade unions, would rightly wish to be consulted.

By 335 votes to 119 the House rejected the Labour Party's amendment expressing dissatisfaction with the declared policy of the Government toward the report and calling for early implementing of the Beveridge plan. It then adopted Mr. Greenwood's motion welcoming the report as a valuable aid on which developments and legislation should be pursued.

Regional Organization of Health Services

Speaking before Mr. Herbert Morrison in the debate on Feb. 18, Mr. STOREY said he feared there had been a tendency to treat as a matter which could be shelved the creation of a health and rehabilitation service. This could not be shelved. The preparatory work done by the Ministry of Health, the Nuffield Provincial Hospitals Trust, the Rushcliffe Committee on Nurses' Salaries, and the Tomlinson Committee on Rehabilitation must be intensified so that a start could be made with a real health and rehabilitation service. They must take every step to reduce the number of claims for illness and the length of the claims. He disagreed with Sir John Anderson's statement that it was intended to put the ultimate responsibility for the health services on the local authorities. He admired their administration and their hospitals, but co-operation between public authorities, voluntary hospitals, voluntary agencies, and the medical profession would not be easily attained if one of the partners in the co-operation had overriding powers. To place responsibility upon local authorities would require complete reorganization of local authority areas. A health service must be based on an area not conterminous with any present local government area. It must be centred upon a key general hospital, often a teaching hospital, where there were available research, consultative, specialist, and technical facilities, and from which the service would radiate out through other general lesser hospitals and health centres to the general practitioner and his patient. Already, under the auspices of the Nuffield Provincial Hospitals Trust, local authorities and voluntary hospitals had formed in many areas regional councils, which co-ordinated hospital policy and took action on common problems without interfering with the day-to-day administration or the individuality of the constituent hospitals. By some extension of that system, by widening the representations on these councils, by granting them some authority, Parliament could contrive a more flexible administration of the health services than by placing the whole responsibility on the local authorities.

Pasteurization Processes—Vitamins in Milk

In a series of replies on Feb. 11 to Mr. Purbrick, Mr. ERNEST BROWN said two processes of pasteurization were prescribed in the Milk (Special Designations) Regulations, 1936–42: a "holder" process whereby the milk must be retained at a temperature of not less than 145° F. and not more than 150° F. for at least 30 minutes and be immediately cooled to a temperature of not more than 55° F.; and a high-temperature short-time process whereby the milk must be retained at a temperature of not less than 162° F. for at least 15 seconds and be immediately cooled to a temperature of not more than 55° F. New proposals in connexion with the control of heat treatment were under consideration. He was advised that the temperature and periods of application necessary to destroy tubercle bacilli ranged from about 135° F. for 40 minutes to boiling point for a fraction of a second. He was satisfied that tuberculosis in cows was infectious through the milk to human beings. Mr. Brown added that pasteurization caused no loss of vitamins A and D; the amount of vitamin B_1 destroyed was too small to be detected by the usual methods of analysis. The loss of vitamin C, which was present in milk only in small quantities, was negligible, and was no greater than would result in raw milk exposed to sunshine for a few minutes before delivery. The effect on vitamin E, which was also present only in small quantities, was not known.

Venereal Diseases: Cost of Propaganda Campaign

Mr. BROWN on Feb. 11 told Dr. Summerskill that the receipts of the Central Council for Health Education for education in the prevention of venereal disease in the current financial year by way of grants from the Exchequer and from local authorities were estimated at £19,000, made up of Exchequer grants not exceeding £5,000 and £6,000 for general and venereal disease work respectively, and local authorities' grants of about £1,000 and £7,000 respectively. The Central Council's function was to provide facilities for the use of local authorities and other local bodies. Its grant income of £13,000 for venereal disease educational work represented working capital for local efforts in support of the Ministry's central propaganda. It was only part of the total expenditure from public funds on education in the prevention of venereal disease.

Treatment of Syphilis in the Army

Mr. ARTHUR HENDERSON in a reply on Feb. 10 said the drugs used in the Army for the treatment of syphilis were neoarsphenamine, bismuth, and in some cases mapharside. Instructions about the use of these drugs were contained in the specific and general instructions issued to medical officers employed in the treatment of venereal diseases. The Army medical authorities received suggestions from time to time for improvements in this treatment and these were carefully considered.

X-ray Apparatus.—Mr. PEAT is aware of the shortage of therapy and diagnostic tubes for *x*-ray apparatus. Steps have been taken both in this country and in the United States to remedy the position so far as the exigencies of the war will permit.

Medical News

"Calcium Metabolism and some Present-day Problems in Nutrition" will be the subject of a paper by Dr. J. D. Robertson of the Courtauld Institute of Biochemistry, to be read at a meeting of the Royal Society of Arts, John Adam Street, Adelphi, London, W.C.2, on Wednesday, March 3, at 1.45 p.m. Lord Horder will preside. A sandwich lunch, which should be ordered in advance, can be procured between 1 and 1.30 at 1s. 6d. per head.

A meeting of the Wireless Section of the Institution of Electrical Engineers will be held at Savoy Place, Victoria Embankment, W.C., on Wednesday, March 3, at 5.30 p.m., when a paper by Mr. G. Parr and Mr. W. Grey Walter on "The Amplifying and Recording Technique in Electrobiology, with Special Reference to the Electrical Activity of the Human Brain" will be read and discussed.

The seventh annual medical conference of the Ex-Services Welfare Society will be held at the Waldorf Hotel, Aldwych, W.C., on Thursday, March 11, at 10.30 a.m., when there will be a discussion on "War and the Neurotic and Psychotic." The proceedings will be opened by Lord Horder.

On account of the sudden indisposition of Dr. A. H. Harkness, who had arranged to address the Medical Society for the Study of Venereal Diseases on "Drug Resistance in Gonorrhoea," the meeting arranged for Feb. 27 has been postponed to some future date.

Medicated (lethane) hair oil for the eradication of head lice is being added to the *National War Formulary*. It consists of equal parts of lethane 384 special and a white oil of high boiling-point. Only one application is necessary, especially if the hair is not washed for one week afterwards, but the instructions must be carefully followed. The oil does not cause any undesirable secondary effects. A uniform pack with instructions for use will shortly be available at all chemists' shops. In future the vitamin content of caps. liq. vitamin A et D conc. (*National War Formulary*) will be reduced; each 3-minim capsule will contain 4,500 units of vitamin A and 450 units of vitamin D.

EPIDEMIOLOGICAL NOTES

Discussion of Table

In *England and Wales* the notifications of measles showed the largest increase—2,762—in any week since the beginning of 1941. The figure for dysentery was only half that of the preceding week; scarlet fever was down by 153, and whooping-cough by 95 cases; the incidence of diphtheria went up by 88.

The fall in the notifications of scarlet fever and of whooping-cough was fairly general, the only big change from the totals of the previous week being a drop of 54 for whooping-cough in Lancashire. The incidence of diphtheria showed a small general rise in the North; there was no change in the trend of this disease in the South.

During the past month the incidence of measles has been steadily mounting in the South but dropping slightly in the North. As a result there has been an appreciable change in the proportionate distribution: during the week ending Jan. 9 the North Midlands, North-Western, Yorkshire, and Northern divisions accounted for 65% of the total notifications, but during the week reviewed these divisions had only 49% of the total. The largest rises during this week were: Yorks West Riding 348, Glamorganshire 280, Gloucestershire 267, Essex 216, Middlesex 215, Durham 200, Staffordshire 166, London 112.

Dysentery was down by 89 cases, but in Cheshire there was an outbreak of 9 cases, and in Northumberland they went up from 3 to 9.

Five more cases of paratyphoid fever were reported from the outbreak in Sussex, Hastings C.B., which began last week with 27 cases.

In *Scotland* primary pneumonia went up from 363 to 466 notifications: 247 cases, an increase of 61, were reported from Glasgow. The small weekly rise in the incidence of cerebrospinal fever that has occurred this year has been due mainly to the experience of Glasgow, where 21 out of 32 cases were recorded during the week reviewed.

In *Eire* diphtheria notifications rose from 95 to 126. The principal centres of infection were the cities of Dublin 46 cases, and Cork 17.

Returns for the Week Ending February 13

The notifications of infectious diseases during the week in England and Wales included: scarlet fever 2,073, whooping-cough 1,596, diphtheria 895, measles 17,308, acute pneumonia 1,542, cerebrospinal fever 124, dysentery 85, paratyphoid fever 4, typhoid fever 1. In the great towns 131 deaths were attributed to influenza.

No. 5

INFECTIOUS DISEASES AND VITAL STATISTICS

We print below a summary of Infectious Diseases and Vital Statistics in the British Isles during the week ended Feb. 6.

Figures of Principal Notifiable Diseases for the week and those for the corresponding week last year, for: (a) England and Wales (London included). (b) London (administrative county). (c) Scotland. (d) Eire. (e) Northern Ireland.

Figures of Births and Deaths, and of Deaths recorded under each infectious disease, are for: (a) The 126 great towns in England and Wales (including London). (b) London (administrative county). (c) The 16 principal towns in Scotland. (d) The 13 principal towns in Eire. (e) The 10 principal towns in Northern Ireland.

A dash — denotes no cases; a blank space denotes disease not notifiable or no return available.

Disease	1943 (a)	(b)	(c)	(d)	(e)	1942 (Corresponding Week) (a)	(b)	(c)	(d)	(e)
Cerebrospinal fever	110	9	32	2	9	181	11	31	3	6
Deaths		1	1				1	6		
Diphtheria	897	31	233	126	43	920	43	197	62	32
Deaths	35	3	1	6	—	29	2	6	—	1
Dysentery	89	12	31	—	—	115	32	46	3	—
Deaths		—		—	—		—	—	—	
Encephalitis lethargica, acute	—	—	1		—	6	—	—		—
Deaths		1					—			
Erysipelas			67	11	—			46	11	2
Deaths		—	—				—	—		
Infective enteritis or diarrhoea under 2 years				20						
Deaths	54	10	6	14	—	42	6	6	6	3
Measles	15,363	933	380	17	65	1,611	147	140	97	26
Deaths	20	2	1	—	—	—	—	—	—	1
Ophthalmia neonatorum	85	3	28		1	83	2	17		—
Deaths										
Paratyphoid fever	8	—	1			9	—	—	—	
Deaths	—	—	—		—	—	—	—	—	
Pneumonia, influenzal*	1,530	86	36	1	4	1,366	88	23	8	9
Deaths (from influenza)	109	15	19	1	—	84	15	5	1	1
Pneumonia, primary			466	19				361	26	
Deaths		—		7	9		—		14	11
Polio-encephalitis, acute	2	—				1	—			
Deaths		—					—			
Poliomyelitis, acute	3	1	1	4	1	7	—	—	—	—
Deaths		—	—		—		—	—		—
Puerperal fever	—	2	27	1	—	2	2	14	1	—
Deaths		—					—			
Puerperal pyrexia	183	6	16		3	176	15	15		2
Deaths		—					—			
Relapsing fever	—	—			—	—	—			—
Deaths										
Scarlet fever	2,119	159	318	60	52	1,113	39	208	33	31
Deaths	3	—	—	1	1	—	—	1	1	—
Small-pox	—	—	—	—	—	—	—	—	—	—
Deaths	—	—	—	—	—	—	—	—		
Typhoid fever†	9	2	2	7	—	11	2	8	6	2
Deaths	1	1	1	—	—	—	—	—	—	—
Typhus fever	—	—	—	—	—	—	—	—	—	—
Deaths			—	—	—			—	—	—
Whooping-cough	1,695	114	122	51	11	1,251	159	31	41	34
Deaths	14	2	1	1	—	7	2	2	—	1
Deaths (0–1 year) Infant mortality rate (per 1,000 live births)	440	53	63	40	19	374	49	103	24	23
Deaths (excluding still-births)	5,236	832	719	221	139	5,730	905	852	231	143
Annual death rate (per 1,000 persons living)			16·2	14·5	‡			19·2	15·4	‡
Live births	6,599	807	890	423	283	5,324	478	802	311	199
Annual rate per 1,000 persons living			18·2	27·8	‡			16·6	20·8	‡
Stillbirths	224	9	49			212	21	37		
Rate per 1,000 total births (including stillborn)			52					44		

* Includes primary form for England and Wales, London (administrative county), and Northern Ireland.

† Includes paratyphoid A and B for Northern Ireland.

‡ Owing to evacuation schemes and other movements of population, birth and death rates for Northern Ireland are no longer available.

Letters, Notes, and Answers

All communications in regard to editorial business should be addressed to THE EDITOR, BRITISH MEDICAL JOURNAL, B.M.A. HOUSE, TAVISTOCK SQUARE, LONDON, W.C.1.

ORIGINAL ARTICLES AND LETTERS forwarded for publication are understood to be offered to the *British Medical Journal* alone unless the contrary be stated.

Authors desiring REPRINTS should communicate with the Secretary of the Journal Board, B.M.A. House, Tavistock Square, W.C.1, on receipt of proofs. Authors over-seas should indicate on MSS. if reprints are required, as proofs are not sent abroad.

ADVERTISEMENTS should be addressed to the Advertisement Manager (hours 9 a.m. to 5 p.m.). Orders for copies of the *Journal* and subscriptions should be sent to the Secretary.

TELEPHONE NO.—B.M.A. and *B.M.J.*: EUSTON 2111.

TELEGRAPHIC ADDRESSES.—EDITOR, *Aitiology Westcent, London;* SECRETARY, *Medisecra Westcent, London.*

B.M.A. SCOTTISH OFFICE: 7, Drumsheugh Gardens, Edinburgh.

ANY QUESTIONS?

Cheiropompholyx

Q.—*Is it accepted that cheiropompholyx is caused by a fungous infection in distant parts of the body?*

A.—The term "cheiropompholyx" is more significant if reserved for an eczematous eruption of itching, deep, tense vesicles which erupt, periodically or episodically, without obvious cause, although nervous factors and local irritation are provocative, as in other types of eczema. If cheiropompholyx extends to the forearms the eruptions there are frankly eczematous, and not infrequently cheiropompholyx develops as part of an extending eczema. Relapses are common. A similar vesicular eruption occurs on the hands in some cases of epidermophytosis of the feet and should be called an epidermophytid. This is an allergic reaction to the epidermophytoxin, and it clears up when the foot infection has been eradicated and does not relapse unless reinfection is established.

Treatment of Parkinsonism

Q.—*A married woman aged 54 has suffered from muscular rheumatism all her life. Nine years ago she noticed weakness and dragging of her right leg, and inability to raise the arms above the head following a "chill." During the past three years she has developed the symptoms of Parkinsonism: shuffling gait, mask-like expression, and rigidity of limbs. She had a special examination five years ago, when nothing abnormal was found. Examination to-day shows generalized muscular tenderness and rigidity. She complains much of pain in the back of the neck on exposure to cold, reflexes and disks normal, and nothing unusual found in cardio-vascular system. Would radiant heat, massage, passive movements, or any other treatment be of value in this case? The symptoms are temporarily relieved by stramonium.*

A.—In the first place, there is no cure for Parkinsonism, but some of the symptoms can be alleviated by suitable means. Massage or electrotherapy is of no help; but passive movements to straighten the limb, and particularly the trunk, often help to overcome the discomfort of the bent attitude. Because of the muscular rigidity there is apt to be pain in the region of certain joints, particularly the neck and the shoulders, and free passive movements should be carried out twice daily to prevent the onset of pain or to relieve it if it is present. The muscular rigidity itself can usually be diminished by drugs of the hyoscine, stramonium, or belladonna group. A useful way to prescribe stramonium is in the form of the tincture, beginning with a dose of 15 minims in water thrice daily after meals, the dose to be increased by 5 minims weekly until the patient complains of dry mouth or misty vision. Then a dose just short of that should be continued with. Very occasionally stramonium, like hyoscine, may give rise to mental confusion in submaximal doses, and if so the drug should be stopped. In certain cases hyoscine acts better than stramonium and should be given as tab. hyoscine hydrobromide gr. 1/150 under the tongue, thrice daily.

Treatment of Paratyphoid Carrier

Q.—*A young woman who had an acute attack of paratyphoid over 5 months ago is still a carrier. After many and varied medical treatments the faeces are persistently infective. What can be done to clear this up?*

A.—Convalescent patients who have been carrying typhoid or paratyphoid bacilli for five months are likely to become permanent carriers. There is no known method of curing them medically. It is worth while, however, trying the effect of iodophthalein and of succinyl sulphathiazole. Soluble iodophthalein should be given orally in a dose of 4 g. three times a week for thirteen weeks. The patient should be kept on a low-fat diet to avoid unnecessary contractions of the gall-bladder, and the dye should be given in the early morning so that the maximum concentration in the bile is reached at night, when rest and absence of food should help to keep the gall-bladder quiet. Succinyl sulphathiazole should be given in a dose of 0.25 g. per kilo body weight in four daily divided doses for five to fourteen days. If neither of these drugs succeeds in freeing the patient from infection with paratyphoid bacilli, excision of the gall-bladder should be considered. This should not generally be undertaken until the patient has been carrying for at least a year. It is wise, also, to make certain, so far as possible, that the organisms are present in the bile. Cholecystectomy usually cures about 75% of chronic biliary typhoid carriers.

Bacteriology of Diarrhoea

Q.—*Has any work been done on the bacteriology of the recent epidemic of diarrhoea? Is there any reason to believe that it was caused by a virus?*

A.—Sonne dysentery has as usual been widely prevalent recently. There have also been cases of enteritis, mild in adults but severe in infants, in which examination of the faeces has failed to show any of the recognized bacterial causes of such a condition. In these circumstances its cause can only be the subject of speculation. There is no evidence that a virus is concerned, but so far as we are aware no experiments which would test this hypothesis have been undertaken.

INCOME TAX

Travelling Expenses, Residence Abroad, etc.

P.'s inquiries may be sufficiently clear from the following replies.

*** (A) Where a single appointment involves attendance at more than one place, any expense "wholly, exclusively, and necessarily" incurred in travelling between them is allowable.

(B) The basis of assessment of the income from an appointment is normally the amount of the previous year. But as the appointment held by P. ceased at Dec. 31, 1941, the assessment based on the previous year's earnings is adjustable to the actual earnings of the nine months ending on that date.

(C) Whether the result of P.'s professional activities when abroad in 1942, whether profitable or the reverse, came within the income-tax field is a matter of some difficulty, and would depend for decision on all the circumstances of his case. In so far as judicial authority goes (Davies *v.* Braithwaite, decided in 1933), the answer is probably in the affirmative.

(D) The fact that P.'s wife has not received a notice of assessment would not invalidate the deduction of tax from her salary. If she is unable to obtain a reply from the inspector of taxes to whom she sent a declaration of income, we suggest that a complaint should be sent to the Board of Inland Revenue, Somerset House, London, W.C.2.

War Damage Contribution

L. inquires whether it is correct that premiums payable for war risk insurance of professional equipment cannot be regarded as deductible for income-tax purposes.

*** Yes. The point is explicitly covered by statutory provision and is beyond dispute. The *raison d'être* may perhaps be said to lie in the fact that it is contemplated that the Exchequer may have to contribute directly from the national funds, and therefore bars the indirect contribution resulting from the loss of income tax which would follow from admitting the deduction of premium.

LETTERS, NOTES, ETC.

Pasteurization of Milk

Dr. H. G. WILLIAMS (Chalfont St. Peter) writes: In my letter (Jan. 23, p. 112) the figures I gave for the bacteria per millilitre of T.T. milk and pasteurized milk are for Scotland. In England and Wales there is no bacterial count done for T.T. milk, but the methylene-blue test must be passed. The bacterial count for "T.T. pasteurized" milk must not be 30,000 per millilitre and for "pasteurized" milk 100,000 per millilitre. The cooling temperature should be 55° F. and not 50° F. I apologize for this omission and mistake.

A Disclaimer

Dr. D. B. CRAIG (Redhill County Hospital, Edgware) writes: I wish to disclaim any knowledge of a notice in the *Hendon and Finchley Times* dated Feb. 12, which mentions my name in connexion with work at this hospital. This was entirely without my authority or knowledge.

Correction

In the report of an investigation into the standard of milk supplied to children in the *Journal* of Jan. 30 (p. 140) the footnote marked by an asterisk under the first table should read: "Double the number of cases of meningitis in 1941 as compared with 1938."